

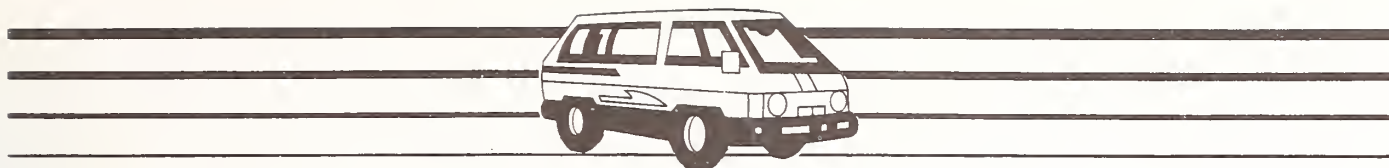


Handbook for Purchasing a Small Transit Vehicle

October 1988

Prepared for
Pennsylvania
Department of
Transportation





Handbook for Purchasing a Small Transit Vehicle



DEPARTMENT OF TRANSPORTATION
Commonwealth of Pennsylvania

HANDBOOK FOR
PURCHASING A SMALL TRANSIT VEHICLE

prepared by

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
BUREAU OF PUBLIC TRANSPORTATION

October 1988

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ACKNOWLEDGMENTS

This document is the culmination of many hours of hard work by Amy Jo Vuxta, an intern for the Bureau of Public Transportation during the last three months. Amy is completing her senior year at Penn State Capitol Campus majoring in Public Policy. Her assignment required Amy to thoroughly research the subject matter by compiling reading material, preparing and distributing vendor and grantee surveys, and conducting many telephone and personal interviews. Partly as a result of her internship, Amy has decided to accept a position in the transportation field with Capitol Bus Company in Harrisburg.

We would also like to acknowledge the assistance provided the many transit professional and small transit vehicle vendors that provided input by responding to our written surveys and many telephone calls. With the information garnered from these valuable sources, we were able to determine what major areas of concern this document should address and do so accurately.

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Source: Reference #14

INTRODUCTION

In recent years, there has been a growth of transportation services offering an alternative to the scheduled, fixed-route services available in urban areas. In addition, public transportation services are beginning to appear more often in nonurban areas. These developments have increased the need for vehicles smaller than the standard thirty-five or forty-foot transit bus. In the State of Pennsylvania, small transit vehicles have become widely used by grantees of several state and/or federally

funded programs. The use of small transit vehicles is increasing, as both small and large transportation providers are finding the vehicles appropriate in a variety of service environments. Small transit vehicles are advantageous over standard transit buses in several ways. They are more maneuverable/easier to drive; more cost effective when passenger demand is low; quieter; and generally more attractive to many passengers and communities.

There are numerous types and sizes of small transit vehicles on the market, and these are constantly changing. In addition, there exists no standard method of grouping the various types of small transit vehicles. Also, because of the novelty of this field of mass transit, there is a lack of conclusive vehicle performance data. The combination of these factors may result in questions and confusion for grantees desiring to procure a small transit vehicle. To answer these questions and eliminate the uncertainties, PennDOT has created this manual. The manual has been designed to assist PA grantees in all stages of the procurement process, from selecting the best vehicle for purchase to receiving delivery of the finished product.

The manual has two parts. The first part contains information on basic vehicle selection and procurement. The major sections of part one are:

- Characteristics of various small transit vehicles
- Objective criteria for choosing the best vehicle to meet specific needs
- PennDOT procedures for vehicle procurement.

Part two of the manual includes a description of a variety of useful new items currently not available in the PennDOT small transit vehicle standard technical specifications, including optional equipment/features. In addition, a list of technical specifications for these items and their approximate costs is provided. Also included in the manual are four appendices: Appendix A provides information on wheelchair accessibility features; Appendix B contains PennDOT's required forms; In Appendix C, the life cycle cost evaluation is discussed; and Appendix D contains alternative seating diagrams.

PART ONE



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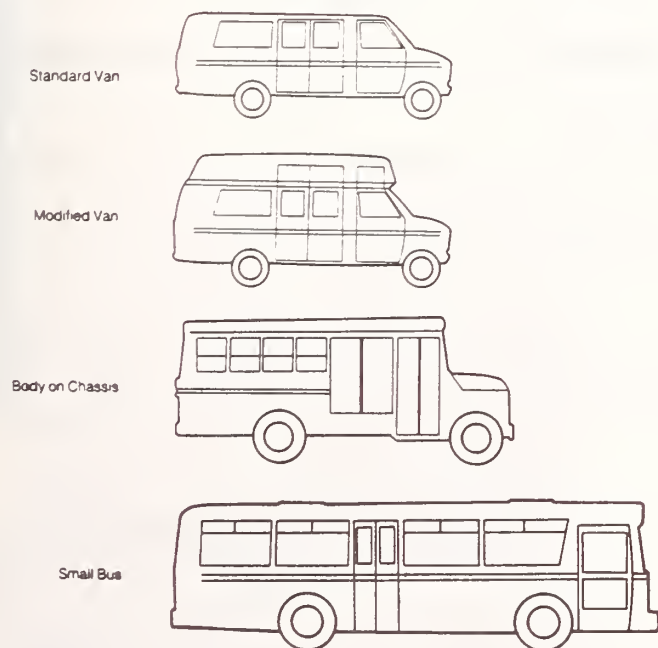


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VEHICLE DESCRIPTION

The expression "small transit vehicle" refers to a vehicle smaller than the thirty-five or forty-foot standard transit bus. Within this group of small transit vehicles there are a number of different types and sizes. There is no accepted standard for the terms used to describe the subgroups of small transit vehicles. For the purpose of this manual, the vehicles will be divided into four groups based upon their method of construction, the source of the vehicle, and the seating capacity. The four groups include: standard vans, modified vans, body on chassis vehicles and small buses (See Figure 1).

Figure 1. Types of Vehicles



Source: Reference #14

STANDARD VANS

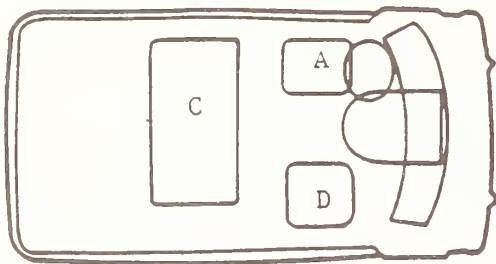
Standard vans are produced by the major automobile manufacturers as part of their standard production line. Vans are, therefore, readily available for buying, and maintenance/service and parts are not difficult to obtain. Standard vans (and mini-vans) are relatively small, with a seating capacity ranging from five to fifteen passengers. Because of their size, they offer greater maneuverability and are easy to drive. Standard vans also cost less, initially, than do other small transit vehicles.

Standard vans do, however, have several disadvantages. Because they are designed for personal use, they may not be durable in transit service. The expected life of a van in transit service is three to five years of typical use, depending upon a number of factors. Difficult entry into the vehicle is another problem posed by standard vans. The high first step and the low roof make entry difficult for elderly and handicapped passengers. The low roof also inhibits movement within the van, particularly for elderly and handicapped passengers moving to and from their seats. Passengers with mobility impairments (i.e. using crutches or walkers) may also have difficulty gaining access to seats, especially in the rear of the vehicle,

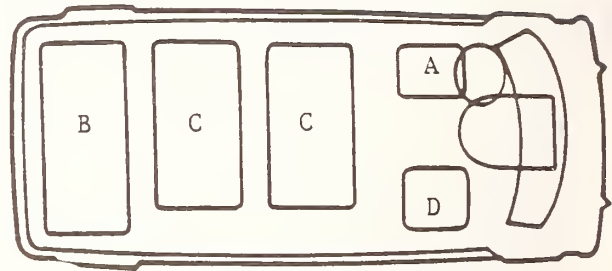
Figure 2. Typical Seating Arrangements for Standard Vans

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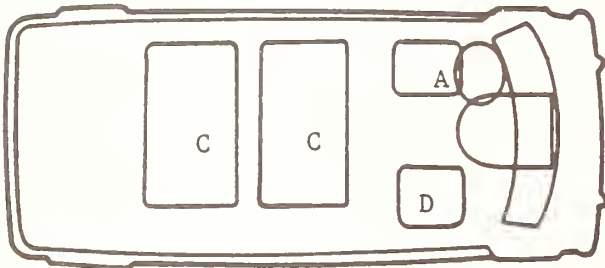
STANDARD VANS



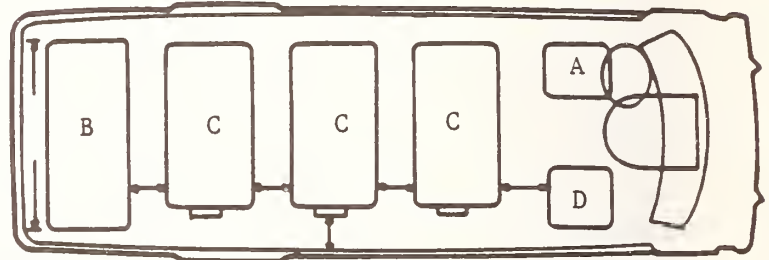
5 passengers



12 passengers



8 passengers



15 passengers

SEAT	SEAT DESCRIPTION
A	DRIVERS SEAT
B	4 PASSENGER SEAT (forward facing)
C	3 PASSENGER SEAT (forward facing)
D	1 PASSENGER SEAT (forward facing)



Source: Ford Motor Company



Source: Reference #14

because of narrow aisles. If a wheelchair ramp or lift is stored in the vehicle, it often protrudes into the van, further limiting seating space and maneuvering room. In addition, the limited interior headroom of most standard vans makes it impossible for some people in wheelchairs to sit up straight when entering the vehicle.

Despite these disadvantages, many grantees have successfully used standard vans to transport their riders. If limited interior space does not pose a problem, the standard van can be a useful alternative as a transit vehicle. Figure 2 contains illustrations of standard vans and typical seating diagrams. For additional information on standard vans, grantees may contact automobile and truck dealers who sell them. Brochures are available which provide a general vehicle description, technical specifications, dimensions, capacities and lists of available options.



Source: Ford Motor Company



Source: Braun Corporation

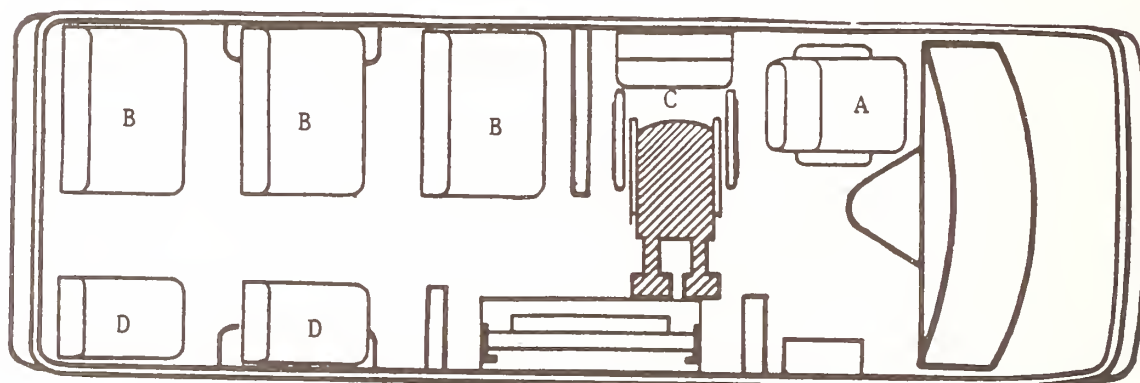
MODIFIED VANS

As previously mentioned, standard vans have accessibility problems and limited headroom. As a result, vans are frequently modified to overcome these limitations and to meet special needs. The modifications usually adjust the structure, and/or include the addition of equipment to improve the performance of vans as transit vehicles. These modifications enable the standard vans to accommodate different types of passengers or provide added comfort and utility to regular passengers. Increasing van size, particularly the height, is the most common modification. This is often accomplished by raising the roof through the addition of a bubble-top or pop-top, lowering the floor, or both. Other modifications may involve: enlarging the entrances; reinforcing and insulating the walls and roof; adding wheelchair lifts, ramps, or low-rise steps to improve accessibility; widening the body and changing

the seating arrangement to increase aisle width and make passenger movement easier inside the vehicle; and installing rubber floor matting, padding on hard surfaces, grabrails and stanchions for support, and additional heaters and air conditioners for passenger safety and comfort. Modifications can also be made to the chassis of the van to increase vehicle durability. These may include an extended or widened wheelbase, heavy-duty brakes, improved transmission and heavy-duty suspension.

Modified vans generally can seat from nine to sixteen passengers. Although modified vans may be longer and slightly wider than standard vans, they are still relatively easy to drive and maneuver. The modifications create more room inside the van, so movement is less restricted, providing passengers with more comfort. Accessibility is generally easier in modified vans than in standard vans. Modified vans do, however, possess potential drawbacks. A raised roof can make the vehicle difficult to handle in heavy

Figure 3.
Accessible Raised Roof Van (Spec A/C)
Seating Capacity Configuration



SEAT	SEAT DESCRIPTION
A	Driver's Seat
B	2 Passenger Seat (Forward Facing)
C	Wheelchair/Flip Seat (Aisle Facing)
D	1 Passenger Seat (Forward Facing)

winds or on sharp curves, and there is a potential for leaks to develop at points where the raised roof is attached to the vehicle. Another drawback to modified vans is reduced fuel mileage due to the added weight of the modifications and the increased wind resistance caused by the raised roof. A variety of modified vans and PennDOT's standard seating arrangements are shown in Figure 3.



Source: Rohrer Bus Sales, Inc.

BODY ON CHASSIS VEHICLES

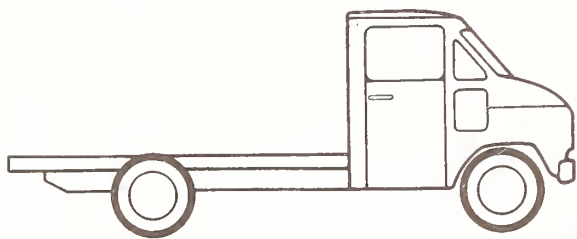
Body on chassis vehicles are produced in two ways. The first method involves building a bus body on the rear of a commercial van cutaway chassis. The second method involves building a complete bus body on a light-duty truck or motor home chassis. This method is used to build standard school buses, and as a result a number of school bus manufacturers have expanded into the small transit vehicle market. A supplier of body on chassis vehicles will purchase a chassis produced by a company such as Chevrolet, Dodge, Ford, GMC or International Harvester. The body is then constructed on the chassis normally around a steel frame that is attached to the chassis (See Figure 4).

Body on chassis vehicles are available in various sizes, with seating capacities ranging from twelve to thirty passengers. Body on chassis vehicles offer certain advantages over vans. For example, they tend to be more durable than vans, having an expected life of five to seven

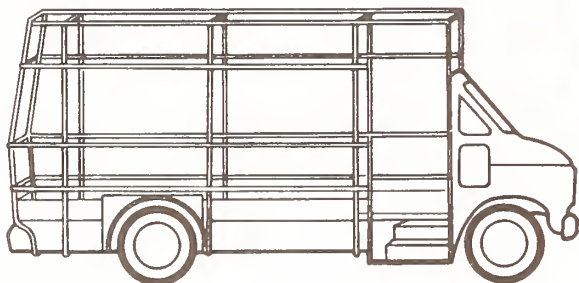
years, depending upon a number of factors. Another advantage is that some body on chassis vehicles have dual rear wheels, making them more stable than vans and, according to some transit experts, safer in accidents.* They also offer more interior space, which is often necessary for lift equipment, and for wheelchair stations. Some body on chassis vehicles have transit-type folding doors and low steps for ease of entry. Another advantage is a larger fuel tank capacity, which can be especially helpful when fueling stops are infrequent. Also, body on chassis vehicles are available with diesel engines. This is advantageous, since diesel fuel is normally less expensive and diesel engines are generally more durable and fuel efficient. However, vehicles fueled by diesel may be louder than those fueled by gasoline, an important consideration to keep in mind.

*Source: Reference No. 13.

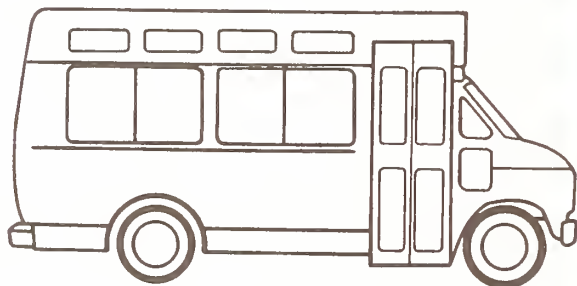
Figure 4 . Typical Construction of a Body on Chassis



1 Chassis is purchased by the body builder.



2 A framework is built for the body.



3 The body is finished and the vehicle is complete.

Source: Reference #14

Another drawback of body on chassis vehicles is that they are not built on a durable transit chassis, and many transit experts feel that a small, heavy duty bus should be purchased when a passenger capacity greater than twenty-two passengers is needed. Some manufacturers produce body on chassis models with less than full standing room, which are not suitable for many transit applications. Also, some



Source: Carpenter Body Works



Source: Rohrer Bus Sales, Inc.

operators comment that the body on chassis vehicles have stiff suspensions which produce a bumpy ride. The process of adding a body to a chassis could result in special problems, such as the body being insecurely attached to the chassis, inaccessibility of chassis components for repair and inspection, and damage of electrical components during body assembly.

For additional information on these vehicles, body on chassis vehicle manufacturers can be contacted. The manufacturers can supply prospective buyers with brochures and general specifications on their products. Chassis and equipment manufacturers, such as automobile/truck manufacturers and wheelchair lift manufacturers, can also supply information if it is not readily available from the bus builder. Figure 5 contains pictures of typical body on chassis and standard seating configurations.



Source: Chance Manufacturing Company



Source: Neoplan USA Corporation

SMALL BUSES

Small buses contain one feature found in few other small transit vehicles—durability. In a small bus, the durability of a standard transit bus is combined with the advantages of a small transit vehicle. Small buses are the largest of the small transit vehicles, seating from eighteen to thirty-five passengers. They are referred to as "purpose-built buses," since they are designed specifically for transit service, and each is constructed as a single unit. In other words, both the body and chassis are supplied by one manufacturer. Since they are designed for transit use, small buses have an expected service life of ten to fifteen years, depending on a number of factors.

The durability of small buses is one of their major advantages. Another is their larger size, which provides a good amount of interior vehicle space. This is especially convenient for passengers in wheelchairs or those who require additional room in which to maneuver. Many of the components of small buses (i.e. transmission, engine and axles) are identical to heavy duty components of standard sized transit buses. This may make maintenance easier, as those standard parts are more readily available. Small buses use diesel fuel, as opposed to gasoline. Although diesel is less expensive, the savings in fuel may be offset

Figure 5. (1)
 Accessible Eleven (10+1 Wheelchair) Passenger Small Transit Bus (Spec A/J)
 Seating Capacity Configuration

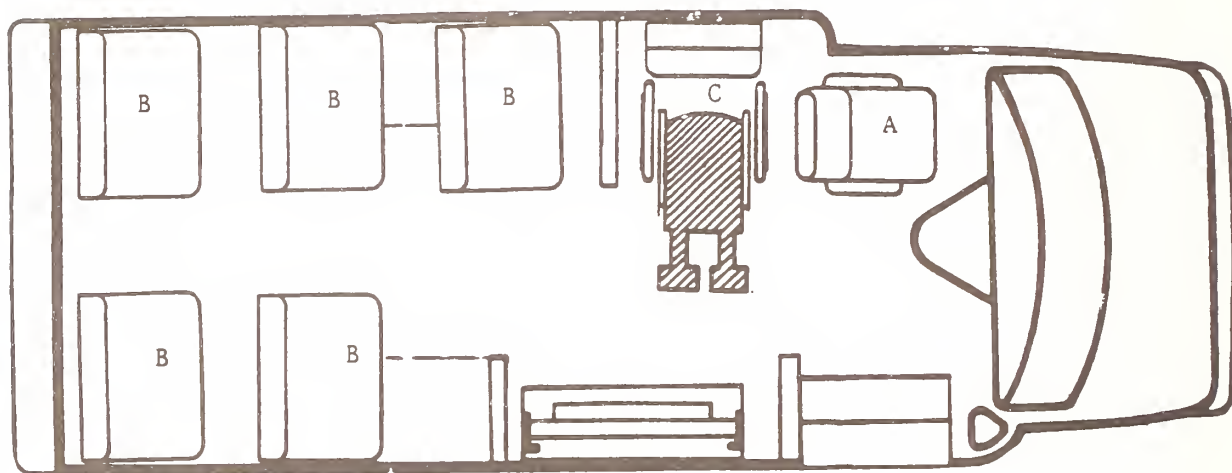
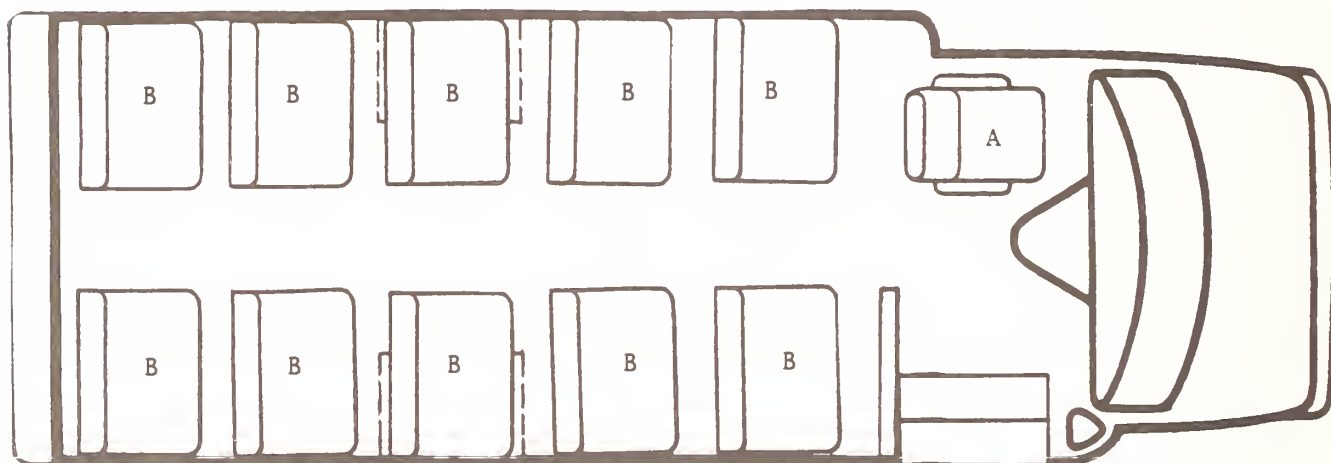


Figure 5. (2)
 Twenty Passenger Small Transit Bus (Spec K)
 Seating Capacity Configuration



SEAT	SEAT DESCRIPTION
A	Driver's Seat
B	2 Passenger Seat (Forward Facing)
C	Wheelchair/Flip Seat (Aisle Facing)

Figure 5. (3)

Twenty-Four Passenger Small Transit Bus (Spec L)
Seating Capacity Configuration

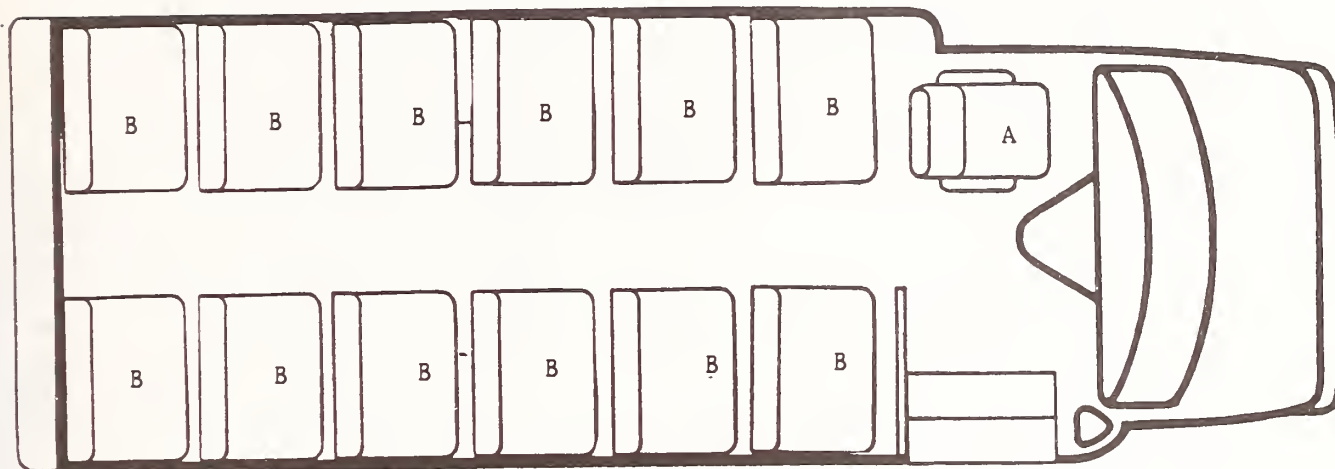
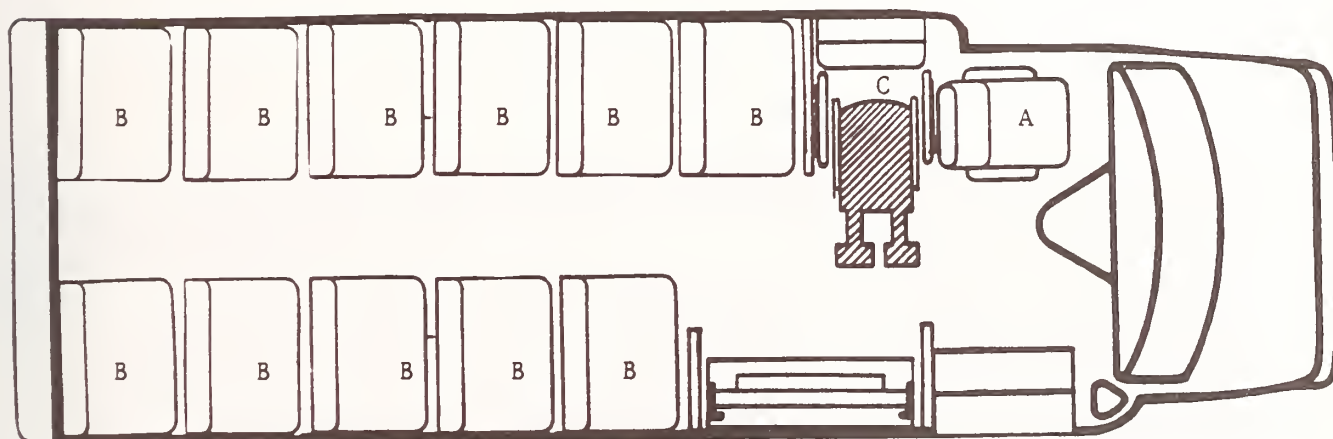


Figure 5. (4)

Accessible Twenty-Three (22+1 Wheelchair)
Passenger Small Transit Bus (Spec A/M)
Seating Capacity Configuration



SEAT	SEAT DESCRIPTION
A	Driver's Seat
B	2 Passenger Seat (Forward Facing)
C	Wheelchair/Flip Seat (Aisle Facing)

by the high purchase price of small buses. Because of their size, small buses are less maneuverable and more difficult to drive, posing another disadvantage.

The best sources for information on small buses are usually the manufacturers themselves, dealers or distributors, and other grantees or transit authorities which have recently purchased similar equipment. Because

most small bus models are relatively new, there is not much information available on their performance. However, the small bus industry is growing, with a variety of types and seating plan options now available. Within a few years, sufficient data on small bus performance should be obtainable. Tables 1 and 2 illustrate some of the characteristics of the different types of small transit vehicles.

Table 1

COMMON TYPES OF SMALL TRANSIT VEHICLES
ADVANTAGES/DISADVANTAGES

Vans (5-16 Passenger)	Body-on-Chassis Vehicles (12-30 Passenger)	Small Buses (18-35 Passenger)
<u>Advantages</u>	<u>Advantages</u>	<u>Advantages</u>
1. Readily available	1. More durable than vans, estimated 5-7 year life span	1. Designed for transit use, estimated 10-15 year life span
2. Easy maintenance	2. Usually dual wheels, more stable	2. Usually diesel, an economical fuel
3. Low-cost parts	3. More interior space	3. Many components same as those in standard transit vehicles
4. Low initial purchase cost	4. Larger fuel tank	4. Good interior space
5. Better maneuverability		
<u>Disadvantages</u>	<u>Disadvantages</u>	<u>Disadvantages</u>
1. Not designed for transit use, low durability, estimated 3-5 year lifetime*	1. Stiff suspension	1. Less maneuverable
2. Entry can be difficult without modification due to low roof and high step	2. Problems from process of adding body onto chassis	2. High purchase price
3. Limited seating space	3. Excessive brake wear	3. Little data on long-term performance
4. Excessive brake wear		

*Life span can be extended from 5 to 7 years with a good preventive maintenance program.

Source: Reference #10

Table 2

SMALL TRANSIT VEHICLES CHARACTERISTICS

Standard Vans	Seating Capacity	5-15
	Price range (1988 \$s)	\$ 12,000 - \$18,000
	Fuel type	Gasoline
	Service life	3-5 yrs.*
Modified Vans	Seating Capacity	9-16
	Price range (1988 \$s)	\$ 22,000 - \$25,000
	Fuel type	Gasoline
	Service life	3-5 yrs.*
Body-on-Chassis	Seating Capacity	12-30
	Price range (1988 \$s)	\$ 35,000 - \$45,000
	Fuel type	Gas or Diesel
	Service life	5-7 yrs.
Small Purpose-Built Bus	Seating Capacity	18-35
	Price range (1988 \$s)	\$100,000 - \$120,000
	Fuel type	Diesel
	Service life	10-15 yrs.

Source:

*Service life may be increased with certain modifications such as the addition of more durable components and a good preventive maintenance program.



Source: Turtle Top, Inc.

VEHICLE SELECTION

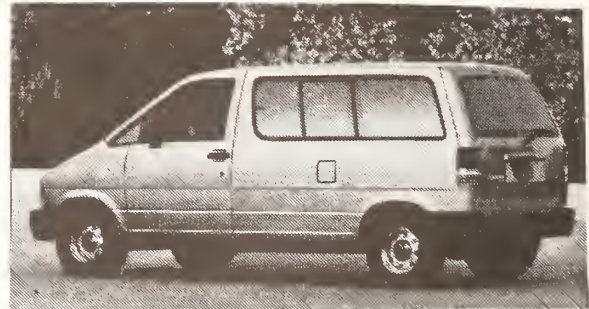
After grantees have become familiar with the various types of small transit vehicles currently available, they can choose a vehicle which most closely fits their service requirements. Since small transit vehicles (with the exception of vans) are made to order, they can be tailored to meet specific requirements. In the vehicle selection process, many criteria must be evaluated to ensure the efficiency of the grantee's transit operations. The key is, in other words, to match the vehicle to the particular type of service for which it will be used and to the physical environment in which it will be operated, without overstepping budget constraints. The selection of a particular body style and vehicle size will be affected by the following factors:

- Service Considerations
- Costs
- Maintenance and Storage Capabilities
- Operating Environment
- Other Factors (i.e. government regulations, community acceptance, etc.) See Figure 6.

Service Considerations

Service Type - Small transit vehicles can be appropriate for a variety of transportation services, differing in route length and purpose. The type of route is

an important consideration in the vehicle selection process. Larger vehicles (small buses), for example, may be effectively utilized for longer trips, while smaller vehicles (vans) seem better suited for demand-responsive service and short trips. Vans may become uncomfortable for passengers over long distances due to the limited interior space. Buses, on the other hand, provide the comfort but may be difficult to maneuver in city traffic or in narrow streets and/or driveways. Type of service route also determines how a vehicle should be equipped. In large service areas, for example, an extra capacity fuel tank may be appropriate. For demand-responsive service, the installation of a two-way radio is required for the transit operation to function efficiently.

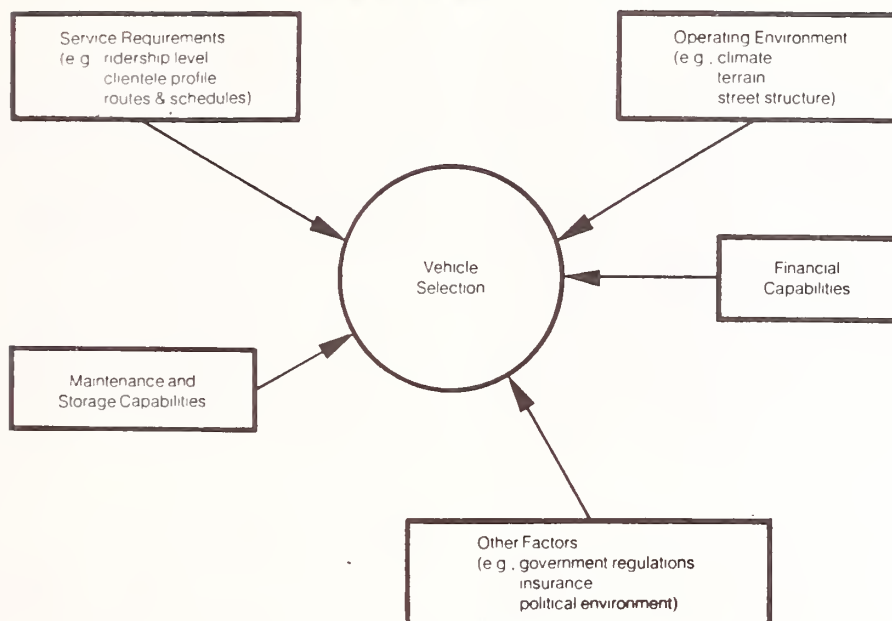


Source: Ford Motor Company



Source: Reference # 5

Figure 6. Factors Affecting Vehicle Selection



Source: Reference #14

Service Demand - Another key factor in determining what size vehicle to purchase is service demand. In an efficient transit operation, the vehicle is usually sufficiently filled. Ideally, the number of people entering the vehicle is equal to the number of people exiting, so that the vehicle is never overcrowded or empty. Although demand is difficult to estimate, experienced transit systems with established routes are able to do this successfully.

Passenger needs - Passenger needs must also be considered when selecting a small transit vehicle. Not only must the vehicle be able to accommodate every passenger, but also any special equipment which may be required. Passengers in wheelchairs, for example, require a ramp or lift to enter/exit the vehicle, handrails for support, wheelchair securement devices for safety, and sufficient room

in which to ride and maneuver. A complete discussion of wheelchair accessibility equipment can be found in Appendix A. Although this equipment is essential for wheelchair passengers, it adds weight to the vehicle, and caution must be taken not to exceed its maximum weight capacity. Passenger comfort and safety is another area which should never be overlooked when selecting a vehicle. Certain tradeoffs, however, may be made. For example, seats with arms may make a bus ride more comfortable for some passengers, but these seats can be difficult to get in and out of. Comfortable, padded seats and interior improvements may be desired for long trips, but an unnecessary expense for short routes.

Costs

Because grantees are operating within an allotted

Table 3

PRICE RANGES FOR SMALL- AND STANDARD-SIZED
TRANSIT VEHICLES

VEHICLE TYPE	PRICE RANGE IN 1988 DOLLARS
Standard vans	\$ 12,000 - \$ 15,000
Modified vans	\$ 15,000 - \$ 25,000
Body-on-chassis	\$ 35,000 - \$ 45,000
Small-purpose built bus	\$100,000 - \$120,000
City bus	\$140,000 - \$175,000

budget, costs at all stages of the procurement process must be considered. The decision to buy a small transit vehicle and which type to buy may ultimately be based upon available funds. Both initial purchase cost (capital cost) and maintenance and operating costs may be considered when selecting a vehicle.

After the vehicle type has been chosen, grantees are required by PennDOT to select the vendor which provides the lowest responsive and responsible bid. Bid selection is based solely upon capital costs, as opposed to maintenance/operating costs. General price ranges for the four types of small transit vehicles are shown in Table 3. It is sometimes difficult, because of the lack of standardization in small transit vehicle descriptions, to assure that competitive bids received from vendors offer functionally equivalent equipment. In addition, the purchase price of small transit vehicles varies by manufacturer and buyer's specifications, and prices will likely increase with unusual or elaborate

specifications.

Vehicle modifications and other options should not be avoided merely because it appears that their inclusion on the vehicle would entail extra costs. Under the competitive bidding process, the bidder may or may not increase the retail price each time an option is specified. Discussion with vendors is advisable to determine the effect of optional equipment on the bid price of a vehicle.

After analyzing capital costs, operating and maintenance costs may also be considered. Costs of this type include fuel costs, vehicle durability, costs of replacement parts and labor, etc. These costs can be a worthwhile trade-off to capital cost. For example, a more costly vehicle is sometimes more durable and less expensive to operate over its useful life than is a vehicle with a lower purchase price. However, data on vehicle operating and maintenance costs is currently difficult to obtain, as such costs are often combined with

administrative costs of the operating agency. Because of this fact, and to ensure a fair, competitive bidding procedure, PennDOT currently relies on the lowest capital cost bid to select a vehicle vendor. Using operating costs as an alternative basis for vehicle selection is addressed in Appendix C of this manual, as "life cycle cost evaluation".

Maintenance and Storage Capabilities

Before any vehicle is obtained, adequate space must be provided for its storage. A limited storage area restricts the number and types of small transit vehicles which can be purchased. Although this fact may seem clear, it must be considered when selecting a vehicle. Another consideration to be made involves vehicle maintenance. After the vehicles have been delivered, they must be properly



Source: El Dorado Motor Corporation



Source: Collins Bus Corporation

maintained. It may be helpful to consider vehicle maintenance requirements as various vehicle types are being considered for purchase. Items such as interchangeable parts (between vehicles), for example, would be advantageous over special-ordered parts when the vehicle needs reparations. A firm maintenance program should be arranged at the time the vehicle is ordered, and begin upon vehicle delivery and acceptance. Preventive maintenance - performing certain required maintenance procedures on a vehicle to prevent malfunctions, rather than waiting until something goes wrong and then fixing it - is strongly recommended. A preventive maintenance program also involves performing necessary repairs promptly, so as to minimize problems.

A good maintenance program is as important to a successful transit operation as is the purchase of the vehicles themselves. Major maintenance work early in the vehicle life should be covered by the vehicle warranties. PennDOT requires that vehicle

warranties be provided by vendors and verified by grantees upon vehicle delivery. After warranties expire, grantees should have adequate arrangements to assure proper maintenance.

One issue that may be encountered with vehicle warranty provisions stems from the fact that some small transit vehicles are constructed by several manufacturers. With modified vans, for example, the modifications are not usually made by the original manufacturer. A modifier acquires the van and modifies it according to an agreement with the buyer. Since the vans are assembled or modified by more than one company, it may be difficult for a grantee to prove which company is responsible if problems occur. This problem may be compounded by geography, as the first stage assembly may be done at a factory in Detroit, Michigan, while the second stage work may be done by a vendor in another part of the country. Similar problems may occur with body on chassis vehicles, as one company manufactures the body, and another the chassis. To facilitate clear warranties, PennDOT has placed all responsibility with the bidder, and warranties they provide should cover the entire vehicle. This is to ensure that grantees receive the most complete and trouble free warranty service.

Operating Environment

Climate, road conditions and terrain also affect the

selection process. Climate dictates whether auxiliary heaters or air conditioners are needed and the type of tires the vehicle requires. Road conditions are also an important consideration in choosing a vehicle. Service in urban or residential areas requires vehicles with a small turning radius which can maneuver through narrow or one-way streets, cul-de-sacs and driveways. Narrow or limited capacity bridges, low underpasses and winding roads located along service routes may also limit the selection of small transit vehicles. Open highway travel, on the other hand, requires less vehicle maneuverability, and virtually any vehicle type would be appropriate. Another consideration is the terrain. For service areas with a lot of steep hills, for example, a vehicle with heaviest-duty brake capacity (and possibly brake retarders) and adequate power should be purchased.



Source: Wayne Corporation

Miscellaneous Considerations

In addition to those mentioned above, there are several other considerations which must be made in selecting a small transit vehicle. A few are discussed below:

- Uniformity of Fleet
- Driver Needs
- Insurance
- Community Acceptance
- Government Regulations

Uniformity of Fleet

If possible, it is advantageous to have a uniform fleet of vehicles. This may, however, be difficult to obtain, as grantees are required through the competitive bidding process to purchase a vehicle having the lowest bid price. Also, the selection of small transit vehicles on the market changes rapidly. Nonetheless, a uniform fleet offers certain advantages. The primary advantage of uniformity relates to maintenance and repairs. Mechanics need only be familiar with one type of vehicle, and it is simpler and cheaper to acquire and keep a parts inventory. It may also improve the efficiency of the maintenance operation since, as problems develop in one vehicle steps can be taken to see that the problem does not recur with the other vehicles. In addition to maintenance, a fleet uniform in passenger capacity and seating arrangement makes scheduling and dispatching easier because vehicles are interchangeable. The main disadvantage of a uniform fleet is that its very

uniformity limits its responsiveness to the varying demands placed upon it.

Driver Considerations

Some transit operations depend upon volunteers to drive the vehicles. As these volunteers may be inexperienced, vehicles should be purchased that are maneuverable and relatively easy to drive.

Community Acceptance

Grantees of small transit vehicles often operate in residential communities. Before purchasing a vehicle, a grantee should ensure that it will be acceptable in that type of setting. Service in residential areas may require small, relatively quiet, unobtrusive vehicles that will not be objectionable to residents. Small diesel buses, for example, may not be acceptable in some communities, due to the noise from the engine.

Government Regulations

Regardless of which type of vehicle is desired by a procurement agency, purchase must be made within the established Federal, State and Local (if applicable) guidelines and regulations.



Source: Turtle Top, Inc.

VEHICLE PROCUREMENT —

PENNDOT PROCEDURES

PennDOT has established a set of procedures to be followed which guides grantees through all the stages of the procurement process. Excerpts of PennDOT's standard forms and documents, referenced throughout this section (indicated by a "B" prefix code) may be found in Appendix B. Complete copies of these documents are available from PennDOT upon request. A timeline overview of the procedures is shown in Figure 7. The timeline is a sample only, and was created to give grantees an idea of what to expect when procuring a small transit vehicle.

Generally, the procurement process for a small transit vehicle works as follows: An organization applies for a grant through PennDOT. Upon grant approval, PennDOT notifies the grantee in writing and contracts are executed.

Along with the approval letter, a copy of the PennDOT small transit vehicle listing is sent to the grantee (See Form B.1). After reviewing information on various vehicles, the grantee chooses a vehicle from the list and requests a standard vehicle specification from PennDOT. PennDOT responds by sending the necessary information to enable the grantee to compile an Invitation for Bids (IFB), including the front-end documents and the technical specifications (See Form B.2).

Topics covered by these front-end documents include bid deadlines (Section A); vehicle delivery and acceptance, terms of payment, warranties and bid bonds (Section B); bid forms (Section D); and protest and dispute procedures (Attachments A and B). Warranties are particularly

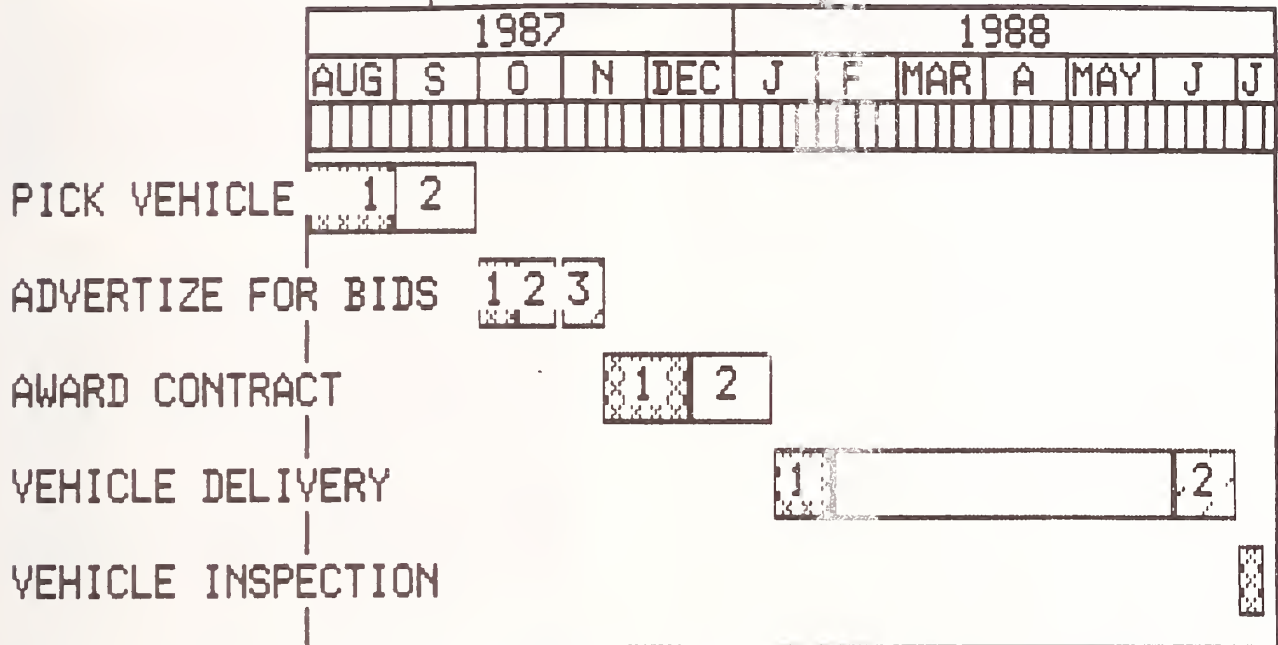


Source: Chance Manufacturing Company

Figure 7.

SAMPLE PROCUREMENT PROCESS TIMELINE

Sample based upon Act 49, (Lottery funded)
Capital Grants Program



This timeline is a sample only, and dates shown are approximations. See below for chart explanation.

PICK VEHICLE

- Phase One (Prior to 9/1/87)
 - Purchaser selects vehicle from PennDOT small transit vehicle listing
 - Purchaser requests and receives specifications, revises specs as desired, and submits to PennDOT for approval
- Phase Two (9/1/87 to 09/30/87)
 - Purchaser obtains PennDOT's approval of spec revisions

ADVERTISE FOR BIDS

- Phase One (10/1/87 to 10/15/87)
 - Ad appears in newspaper forty-five (45) days prior to bid opening! Purchaser distributes Invitation for Bids (IFB) to vendors.
 - Purchaser receives requests for clarifications, exceptions, and/or approved equals from vendors
- Phase Two (10/16/87 to 10/30/87)
 - Purchaser conducts a pre-bid conference, if necessary
 - Purchaser determines if vendor requests are acceptable
 - Purchaser gets PennDOT approval of changes and/or addenda which will be made to the IFB
 - Purchaser sends all changes and/or addenda to all bidders by 10/30/87
- Phase Three (11/01/87 to 11/15/87)
 - Purchaser assures that there are no unanswered protests
 - Purchaser conducts a public bid opening on 11/15/87

AWARD CONTRACT

- Phase One (11/15/87 to 12/15/87)
 - Purchaser selects lowest responsive and responsible bidder
 - Purchaser sends bid summary to PennDOT
- Phase Two (12/16/87 to 01/15/88)
 - Purchaser receives PennDOT concurrence with low bid selection
 - Purchaser awards contract

VEHICLE DELIVERY

- Phase One (01/16/88 to 02/06/88)
 - Bidder shall provide VIN (Vehicle Identification Number) to purchaser
- Interim (02/07/88 to 06/08/88)
 - Vehicle is being constructed
- Phase Two (06/09/88 to 06/30/88)
 - Notify PennDOT within twenty-one (21) days of delivery and forward requisition form and vendor invoice to PennDOT (to prepare the check). Vehicle is delivered by 6/30/88.

VEHICLE INSPECTION

- (07/01/88 to 07/10/88)
 - Vehicle inspection is completed by purchaser within ten (10) days after delivery to determine if the vehicle is acceptable.



Source: Reference #5

significant, as problems may arise during the operation of the vehicles. Since body on chassis vehicles and modified vans are constructed by more than one manufacturer, it may be difficult for a purchaser to prove which company is responsible if problems occur. To facilitate clear warranties, PennDOT has placed all responsibility with the successful bidder, who must assure that all warranty obligations are met regardless of who manufactured the item.

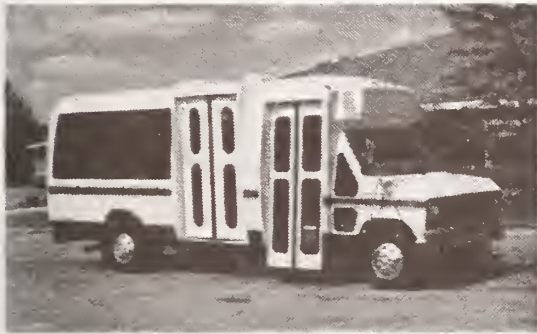
The technical specifications portion of the IFB (Section C) determines the actual components, construction and performance requirements of the vehicle. PennDOT currently provides technical descriptions for six basic types of vehicles useful in transit service—vans, modified vans, mini-vans, station wagons, 4-wheel drive trucks and small body on chassis buses. The number of variations on these vehicles (for example, seating capacity, wheelchair accessibility features, etc.) enables PennDOT to provide over twenty-five categories of vehicle specifications. An excerpt from a PennDOT technical specification may be seen in Form B.3.

After reviewing PennDOT's technical specifications, the grantee may accept them exactly as written, or choose to revise the specs. The grantee is not restricted to PennDOT's specification package. Any number of justifiable changes may be made to PennDOT's specs to accommodate the grantee's particular transit needs. If, for example, the grantee would prefer a seating diagram other than the standard layout pictured in the PennDOT specs, he has the right, within legitimate reason, to change it. However, if changes of this type are made, the grantee must also be sure to revise points in PennDOT's technical specs which pertain to the vehicle's interior/seating area. Or if the desired vehicle contains optional equipment or features not covered in the PennDOT technical specs (for example, energy-absorbing bumpers, roof vent, etc.), the grantee may request additions to PennDOT's standard specs. All requests for changes or additions to the standard IFB must be





Source: Collins Bus Corporation



submitted on a "Request Sheet for Changes/Additions to IFB Package" (See Form B.4). Technical specifications for several optional items, along with their approximate costs, are provided in Part two of this manual for grantees' reference.

After the technical specification package has been modified to the grantee's satisfaction, even if no changes to the PennDOT standard specs have been made, the entire IFB package must be submitted to PennDOT for approval. Upon approval, PennDOT will send a letter to the grantee (See Form B.5), and a new stage in the procurement process, advertising for bids, begins.

A bid is basically a statement of which vehicle and with what features, a supplier (vendor) will sell to a buyer

(grantee) at a given price. If the vehicle the buyer wants is specified to bidders, a comparison of bids allows the buyer the opportunity to purchase the best buy. Because the small transit vehicles are procured with public monies, a fair, open and competitive process of receiving and analyzing bids is mandatory. Within thirty days after receiving IFB approval from PennDOT, grantees are required to establish a date, time and place for a public bid opening, and to place a formal advertisement for bids in at least one publicly circulated document (i.e. newspaper, journal, etc.). Bid advertisements may vary in style, length and content (See Figure 8 for sample bid advertisements). Advertising for bids must occur at least forty-five days prior to the date of the bid opening unless a shorter bid cycle is approved by PennDOT. In addition to advertising, grantees are required to send their IFB to a minimum of three vendors, which may be selected from the "Small Transit Vehicle Vendor List" (See Form B.6 for sample page).*

Upon receiving the IFB, bidders may wish to clarify or contest specifications, or ask for approval of what they consider an equivalent

* Grantees should be aware that the vendors are coded by the types of vehicles they sell; only those whose vehicles match the desired type should be selected.

Figure 8. Sample Advertisements (Invitations for Bids)

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF
PUBLIC TRANSPORTATION
NOTICE TO BIDDERS**

Separate sealed bids for:
up to twenty-two (22) buses especially designed to transport elderly and handicapped persons and having a capacity for 12-16 passengers, (Bid Package A)

and
up to thirteen (13) buses especially designed to transport elderly and handicapped persons and having a capacity for 18-24 passengers (Bid Package B)
will be received by the Illinois Department of Transportation at the offices of the Illinois Department of Transportation, Division of Public Transportation, 300 North State Street, Room 1002, Chicago, Illinois 60610, until 11:00 o'clock A.M. (CST), July 23, 1980, and at that time publicly opened and read.

BIDS WANTED

This request for bids is being undertaken on behalf of the purchasers, private non-profit agencies in Illinois whose applications for capital grant assistance have been approved by the federal government under the provisions of Section 16(b)(2) of the Urban Mass Transportation Act of 1964, as amended.

Any and all contracts resulting from these bids are subject to the terms of the financial assistance contracts between the Illinois Department of Transportation and the United States Department of Transportation and between the purchasers and the Illinois Department of Transportation.

The Illinois Department of Transportation, on behalf of the purchasers, reserves the right to reject any and all bids and to excuse non-compliance with formal requirements in the bids and bidding when, in the judgment of the Department, the best interests of the purchasers will be served and the spirit of competition will be maintained.

Any individual, firm, partnership or corporation appearing on the United States Comptroller General's list of ineligible contractors for federally financed and assisted construction is not an eligible bidder.

The Department hereby notifies all bidders that in regard to any contract entered into pursuant to this solicitation for bids, minority business enterprises will be afforded full opportunity to submit bids in response, and will not be subject to discrimination on the basis of race, color, sex, or national origin in consideration for an award.

Within fifty calendar days following the publication of this Notice to Bidders, pre-bid qualifications and certification forms must be completed and submitted to the Department by prospective bidders.

Copies of pre-bid forms and all other bid materials may be obtained from the 16(b)(2) Project Manager, Illinois Department of Transportation, Division of Public Transportation, 300 North State Street, Room 1002, Chicago, Illinois 60610.

Stephen Schindel, Acting Director
Division of Public Transportation

BIDS WANTED

INVITATION FOR BIDS

The Greater Hartford Transit District (the "District") hereby gives notice that it will receive sealed bids for the purchase of up to twenty-three (23) 12-passenger vehicles, seventeen (17) of which shall have wheelchair lifts.

Bids shall be submitted on forms furnished by the District and shall be addressed to:

Mr. Arthur L. Handman
Executive Director
Greater Hartford Transit District
179 Allyn Street
Hartford, CT 06103

Bidders shall submit their bids in a sealed envelope and shall indicate on the face of their bid envelopes the following: "Bid for Lift-Equipped Passenger Vehicles".

Bids will be received up to but not later than 11:00 a.m. local time, October 6, 1980. At that time, the bids will be publicly opened and read aloud at the District's office. Bids must remain in effect for thirty (30) days from the bid opening.

Requests for copies of the Technical Specifications, General Specifications, and Bid Forms and all inquiries related thereto shall be directed to the above addressee. Telephone inquiries may be made to either the above addressee or Mr. Samuel G. Billings, Transit Planner, at (203) 247-5329.

All bids and related documents will be subject to financial assistance contracts between the District and the U.S. Department of Transportation, Urban Mass Transportation Administration (UMTA) and between the District and its local operators. All bidders will be required to certify that they are not on the Comptroller General's list of ineligible contractors. The successful bidder will be required to comply with all applicable Equal Opportunity Laws and Regulations.

Bids must be accompanied by a certified or bank check or acceptable surety bond in an amount not less than five percent (5%) of the total bid price. The check or surety bond will be returned to unsuccessful bidders. Such bid bond received from a successful bidder will be held until said successful bidder furnishes a performance bond with surety or certified or bank check for the full amount (100%) of the contract to the District. Upon receipt of said performance bond, the bid bond will be returned to the successful bidder.

The District reserves the right to accept any bid or reject any and all bids and to waive any irregularities.

Dated: August 12, 1980
By: ARTHUR L. HANDMAN
Executive Director

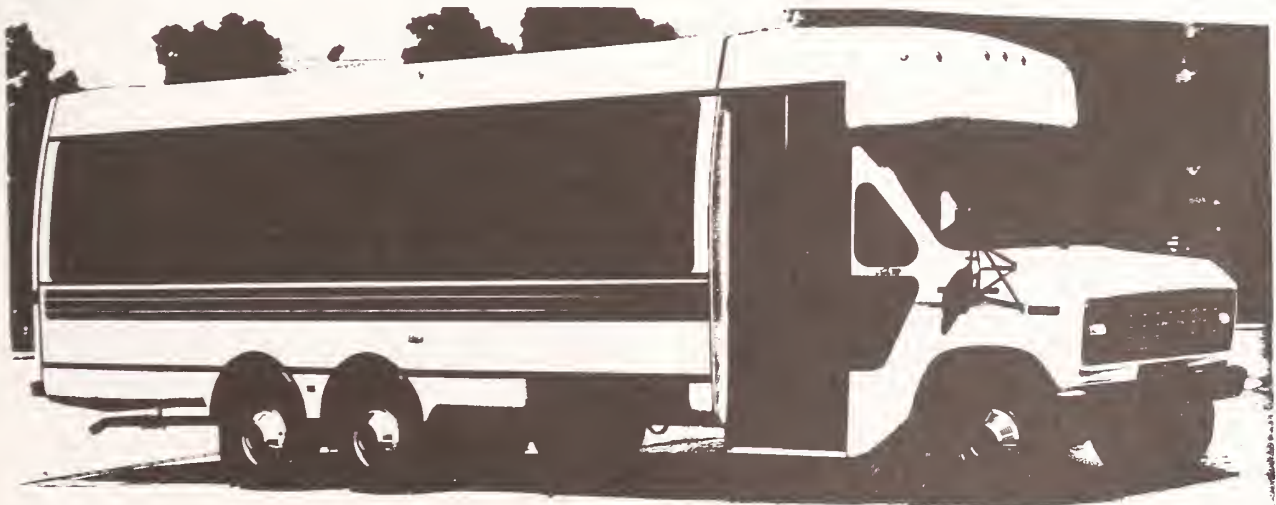
Note: Both these advertisements appeared in PASSENGER TRANSPORT, v. 38, the first in no. 21, May 23, 1980; the second in no. 34, August 22, 1980. Source: Reference #14

specification. For complex procurements with significant changes to the standard IFB, grantees should consider a prebid conference to allow the opportunity for bidders to meet with the grantee and clarify IFB provisions. The conference would allow for discussion on whether the provisions in the IFB are reasonable (i.e. that most suppliers can meet those provisions and bid on contracts) and may result in greater competition. As a result of this conference, changes or addenda to the proposed contract may be issued. Any changes to the IFB must receive PennDOT approval and must be sent to bidders within fifteen days prior to bid opening.

If bidders have no questions regarding the IFB, they proceed to send their bid, or "price quote" for the specified vehicle, to the grantee. Included with the bid is a bid bond, or guarantee that the bidder will sign the contract if it is awarded to him. The bid bond is usually a certified check or surety bond

for ten percent or more of the total bid price. If a bidder fails to accept the contract award, the grantee has the right to keep the bond amount as collateral. After all bids have been reviewed and the contract awarded, the bid bonds should be returned to all bidders.

On the designated bid opening day, the grantee publicly opens and reads the bids. The IFB requirements determine the information bidders are required to submit with the bid. Bidders are also required to furnish other pertinent information on the vehicle bid, if requested by the grantee. Information of this type may include a complete description of the vehicle and equipment, paint samples, location of the nearest spare parts/repairs store, descriptions of all warranties, etc. Evaluating this information prior to contract award assures the grantee that the lowest bidder is responsive and responsible. In addition to performing this "pre-award review," the



Source: Turtle Top, Inc.

grantee and/or PennDOT may conduct a "pre-award inspection." This involves visiting the place of assembly to assure that the bidder has all the qualifications needed to produce the requested vehicle within the allotted time period. The pre-award review and inspection are not required by PennDOT, However, it is recommended that the grantee obtain as much information as possible to aid in choosing the bidder for contract award.



Source: Welsh Equipment Company, Inc.

After selecting a bidder, the grantee prepares a bid summary for PennDOT review. If PennDOT concurs with the selection, the grantee is sent a letter of notification (See Form B.7). The grantee may then award the contract to the named bidder, who is obligated to honor his bid for sixty days after bid opening. At this point the grantee may have the option of replacing the bid bond with a performance bond, to guarantee that the chosen bidder will fulfill the contractual obligations. A performance bond is, however, optional and not part of the PennDOT standard procedures. The successful bidder cannot be required to provide a performance bond unless it was stipulated up front in the IFB.

When the contract has been awarded, the bidder orders the vehicle chassis, which is assigned a manufacturer's serial number or vehicle identification number (VIN). The bidder must provide the grantee with the VIN, if available, within twenty-one (21) days of contract award.

Delivery of the vehicle is to be completed within sixty days after the bidder receives the vehicle chassis. By using the VIN, the grantee can trace the vehicle if delivery is delayed.

To avoid vehicle problems upon delivery, on-line inspections may be conducted. This inspection may be performed during any stage of construction at the place of assembly. However, it can be costly and does not always guarantee that a vehicle will be free of defects.

When the vehicle is nearing completion, PennDOT must be notified of the exact delivery date. This enables PennDOT to prepare a check, so payment can be made promptly. Grantees are encouraged to notify the bidder of his responsibility to provide a vendor's invoice and timely delivery notice to insure prompt payment (See Forms B.8 and B.9).

Within ten days after the vehicle has been delivered, it must be thoroughly inspected by the grantee. There are two major reasons for inspections. The first is to assure supplier compliance with the specs in the IFB agreement. The second is that some vehicles may have defects upon arrival. Fortunately, a majority of the defects are minor and can be corrected quickly. Loose bolts, malfunctioning headlights, etc. are common defects. Repairing the vehicle in house, or sending it back to the vendor or a local mechanic for repairs may delay its entrance into service. However, correcting defects upon delivery can avoid unexpected and more costly problems later on. Also, once a vehicle is accepted and placed in service a defect may become the responsibility of the grantee rather than the vendor.

For inspection upon delivery, PennDOT provides to grantees a "New Vehicle Operation Inspection Checklist" (See Form B.10). Grantees cannot accept a vehicle until it has undergone a complete inspection. If the vehicle is

fully satisfactory, grantees make full payment within ten days. If the vehicle is basically acceptable but has some minor defects, it can be conditionally accepted. In this case, the vehicle can be placed in service and partial payment is withheld until all necessary reparations have been completed. Grantees must notify the vendor in writing of the defects to be repaired before final payment will be made. For totally unacceptable vehicles, no payments are made until the defects have been corrected. When all defective items are corrected and the vehicle is determined to be in acceptable condition, a copy of the completed inspection checklist must be sent to PennDOT.

For additional information on PennDOT's bid procedure, see the "Mandatory Competitive Sealed Bidding Procedure" (Form B.11). Also, PennDOT provides a summary of the entire procurement process in the form of a checklist. This guide allows the grantee to check off each item of the process as it is completed (See Form B.12).



Source: Carpenter Body Works



Source: Turtle Top, Inc.

PART TWO

INTRODUCTION

This section is devoted to optional items available on various small transit vehicles. The purpose is to identify available options and their features to allow grantees to evaluate the need for the options in their specific operating environment. Many of the features/equipment mentioned herein have been specifically requested by Pennsylvania grantees based on their experience in small transit vehicle operations. The items discussed in this section vary considerably in size, cost and availability from one vehicle type to another. These items may be included in a grantee's Invitation for Bid (IFB), if available for the type of vehicle requested and the need for the item can be justified by the grantee. However, they are optional - not standard features. As such, they are not included in the PennDOT standard technical small

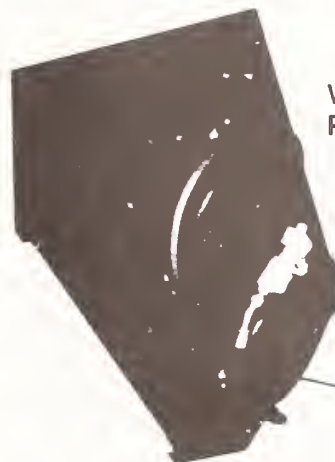
transit vehicle specifications.

To assist grantees who wish to obtain one or more of these optional features on the vehicle(s) they are procuring, the following information is included in our alphabetized listing: a brief description of the optional item/equipment, including the benefits associated with it; an estimated cost of the installed optional item/equipment; and a technical description which can be used by the grantee to revise the PennDOT specifications and include the item in the IFB. Also included in this section are photographs of many of the optional items, along with the names of companies which manufacture them. Grantees may wish to contact the manufacturers directly to obtain more detailed information on a specific option.



UNIT UNPROTECTED

Fan shrouds, fans, coil (at rear) all exposed to the weather.



FAN WINTERGARD PROTECTORS

Pre-formed protectors fit snugly over the fan shrouds, held in place with 3 bolts. Holes in shrouds are pre-drilled for easy installation.

High impact ABS plastic.

WINTERGARD REAR COIL COVER

It's designed to fit over the bottom of the unit. Insulated strip assures a tight seal. The coil cover is held in place by bolts; holes are pre-drilled for easy installation.

Coil cover is galvanized steel with fusion-bonded epoxy.



UNIT COMPLETELY WEATHER PROTECTED.



KIT CONTAINS:

Fan shroud covers, 1 front coil protector and mounting accessories.

Air Conditioner Winter Protection

Source: A/C Industries

AIR CONDITIONER

AIR CONDITIONER WINTER PROTECTION

An air conditioner winter

protection system extends the useful life of the vehicle's air conditioner by protecting it from corrosion by harsh weather conditions and/or road salt.

Approximate Cost: \$75.00
per kit

Technical Description:
Vehicle's air conditioning

condenser shall be equipped with protective covers of galvanized steel with fusion-bonded epoxy and high impact ABS plastic for corrosion resistance. (A/C Industries, Wintergard Kit, or approved equal).

BRAKES

BRAKE RETARDERS

For vehicles operated in hilly terrain, it may be desirable to consider the use of brake retarders. These are hydrodynamic braking devices which attach to the driveshaft. The retarders assist the brakes in stopping the vehicle by turning an impeller in a fluid which absorbs vehicle energy. Retarders have been shown to increase brake service life and

Telma Brake Retarders



The foot control operates in conjunction with the vehicle brakes. Retardation is controlled by the amount of pressure on the brake pedal.

reduce vehicle downtime. Some transit authorities contend that brake retarders are unnecessary on standard and modified vans, but beneficial and highly recommended on larger size vehicles.

Approximate Cost:

\$4,500.00 per vehicle

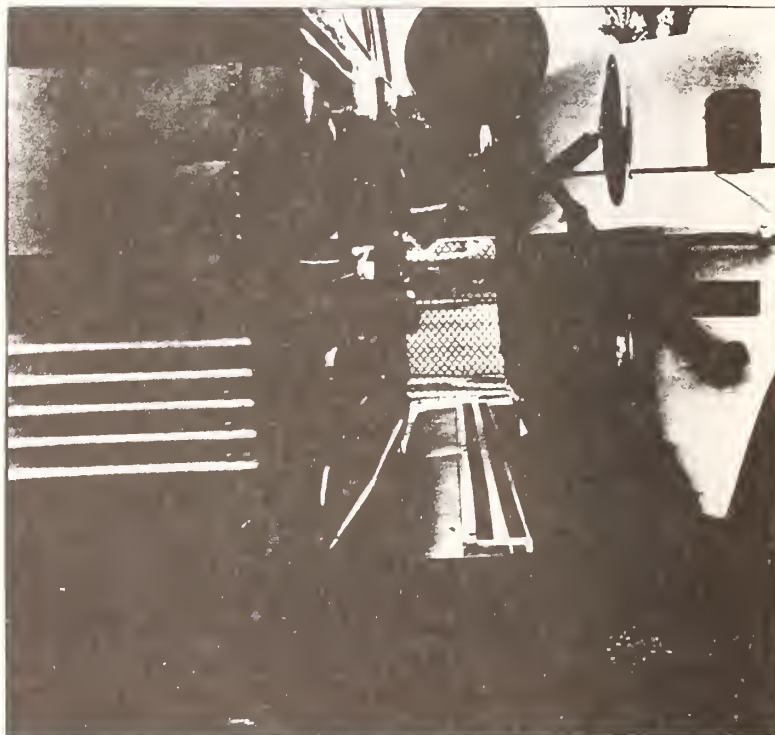
Technical Description:

Vehicle shall be equipped with foot-operated Electric brake retarders. (Telma electromagnetic CC-80, or approved equal).

BUMPERS

ENERGY-ABSORBING BUMPERS

Energy-absorbing bumpers protect the vehicle from damage during repeated impacts of 5 to 10 m.p.h. They reduce down time and maintenance and



The HELP energy absorbing bumper

Source: Romeo Rim, Inc.

insurance costs by protecting the body from damages normally incurred in minor accidents.

Approximate Cost: \$600.00 per bumper

Technical Description:

Vehicle shall be equipped front and rear with high energy absorbing bumpers having antiride capability (Romeo Rim, Inc. HELP Bumper, or approved equal).

CEILING GRAB RAIL

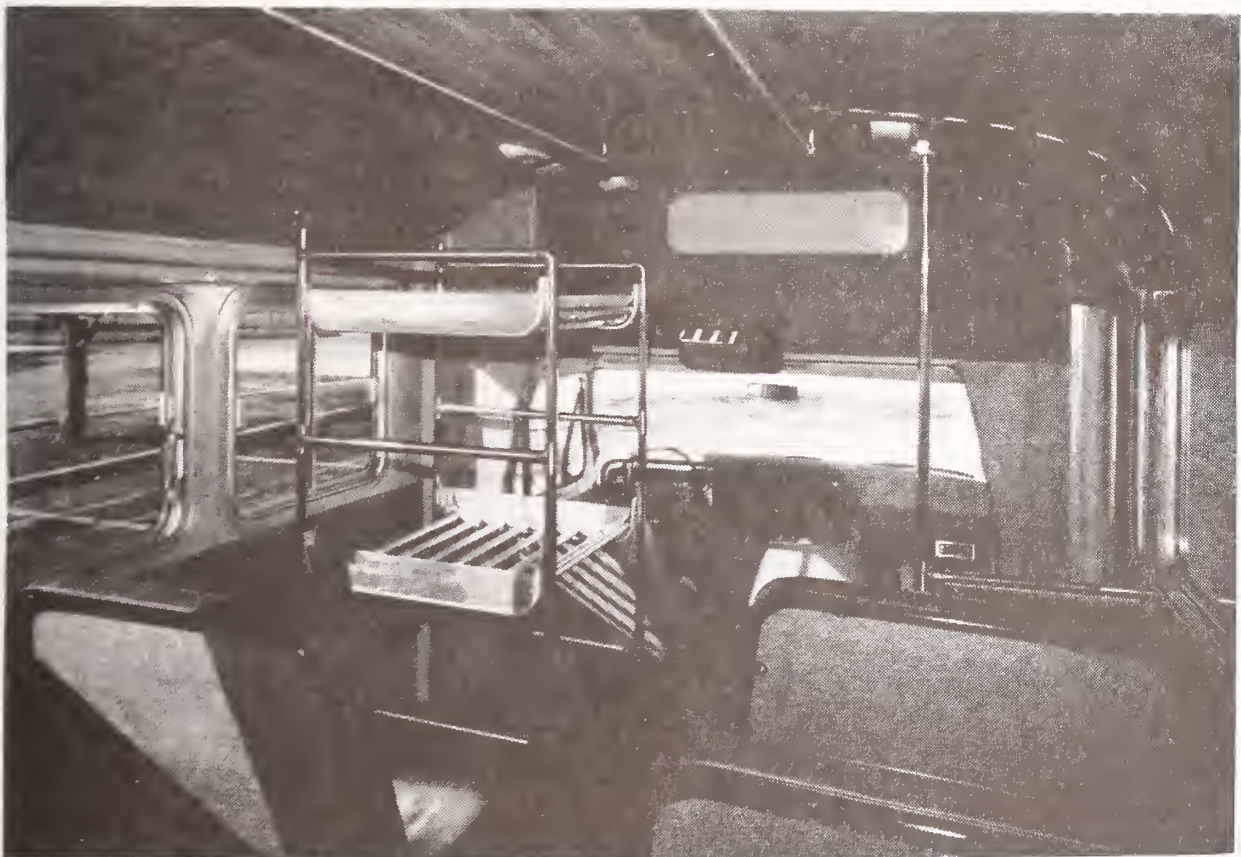
VEHICLE CEILING GRAB RAIL

Also called "roof rail" or "hanger rail", the vehicle ceiling grab rail is a safety feature to assist passengers in

Vehicle Ceiling Grab Rail



Source: Carpenter Body Works



Vehicle Ceiling Grab Rail Source: Carpenter Body Works

moving throughout the vehicle and can be used by standees. This option would not be desirable in vehicles where the headroom is already limited.

Approximate Cost: \$150.00 per rail

Technical Description: A minimum of one grab rail of minimum one inch outside diameter steel tubing padded with integrally molded padding shall be mounted on the vehicle ceiling. The rail shall be a minimum of sixty-eight (68) inches above the floor extending from behind the driver to the rear of the vehicle, securely fastened to the vehicle at not less than three locations.

CLOCK

DIGITAL CLOCK

A digital clock assists the vehicle driver in maintaining a timely schedule.

Approximate Cost: \$40.00

Technical Description:

Vehicle shall be equipped with a factory-installed digital clock located in the dashboard in an area easily visible by the vehicle operator.

Digital Clock

- Easy to read L.E.D.
- 2½" x 2" x 1".
- Surge protector included.



Digital Clock

Source: Division Transportation Systems

CRUISE CONTROL

CRUISE CONTROL

Cruise control as a safety feature prevents the vehicle from reaching excessive speeds on long highway trips, and saves energy. It also helps to reduce driver fatigue and adds convenience to driving the vehicle.

Approximate Cost: \$200.00 per vehicle

Technical Description:
Vehicle shall be equipped with a factory-installed cruise control feature.

DIESEL

DIESEL ENGINE

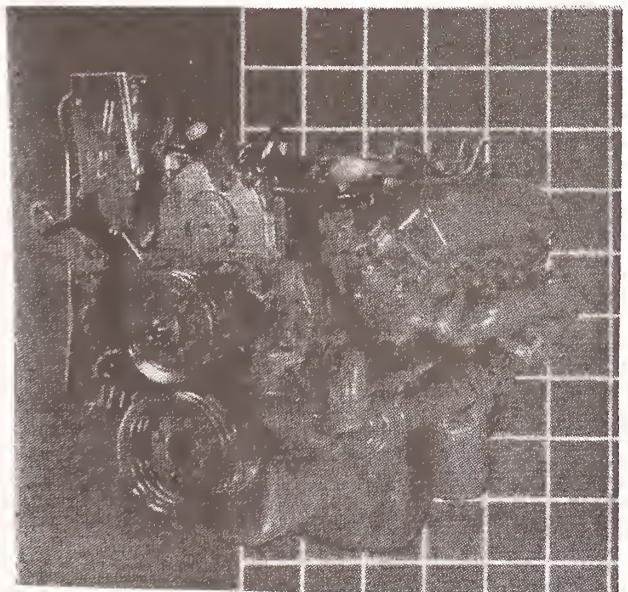
Although the PennDOT standard specifications currently specify gasoline engines, the use of diesel is an option available to grantees. The major difference between gasoline and diesel engines is that gas engines ignite electrically, whereas diesel engines ignite by friction and compression. Diesels do not have the electrical components that gasoline engines require, since diesels do not need carburetion (the mixing of air and fuel).

Diesel engines have a number of advantages over gasoline engines. First, diesel fuel is normally less expensive. Diesel engines also provide better fuel mileage - a savings in fuel use of up to fifty percent, depending upon trip length, weather and road conditions, condition of vehicle, speed, driving habits of operator, weight of the

vehicle and vehicle accessories.* The reduced fuel consumption results in lower direct operating costs. Diesel engines also have a longer engine life, which allows for improved warranty coverage. While the standard gasoline engine vehicle warranty extends for 12,000 miles or one year, diesel engine warranties may range from 12 months or 25,000 miles to 24 months or 100,000 miles. Because of their reliability, diesel engines provide fewer maintenance costs as well. In addition, highly refined diesel fuel reduces air polluting emissions from the vehicles.

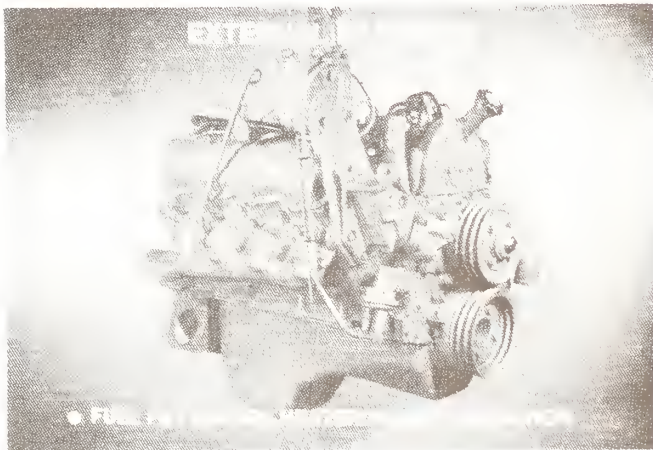
Diesels do, however, have several disadvantages in comparison to gasoline engines. One is the high initial purchase price. A diesel engine can increase a vehicle's capital costs from \$2,500.00 to \$3,000.00 dollars over the cost of a gasoline engine. Also, diesels may be difficult to start in cold

*Source: Reference No. 3



Diesel Engine Source: Ford Motor Company

weather, requiring heated indoor storage or the purchase of engine heating equipment. The so called "block heaters" used for this purpose cost from \$40.00 to \$60.00, but are often included in the purchase price of diesel engines. Diesels are usually equipped with a pyrometer, a device used to measure temperature, to insure that the engine is warm enough to operate. Although diesel fuel is less expensive than



Diesel Engine Source: Ford Motor Company

gasoline it is in relatively low demand. Since it spends more time in storage than does gasoline, the opportunity for water contamination increases. Water filters are therefore standard equipment on diesel engines, and require periodic service. In addition, the stop-and-go driving commonly found on transit routes causes a diesel to produce more soot than does a gasoline engine. This soot can contaminate the oil, requiring frequent oil changes. Diesel engine maintenance is, however, generally less costly than gasoline engines, but does

require some special tools and mechanics familiar with diesels engines. Finally, diesels may be inappropriate (and unacceptable) for some transit routes, especially in residential areas, due to the noise, heat and fumes they produce.

There are several types and configurations of diesel and gasoline engines from which to choose. Diesel engines are generally available on all types of small transit vehicles but the grantee usually does not have a choice of engine size, as with gasoline engines. Because of their high purchase cost, diesel engines are not recommended for use on transit vehicles such as vans and modified vans which have a relatively short useful life expectancy. However, diesel engines may be appropriate on larger transit vehicles (such as body on chassis and small buses). Because of the longer useful life expectancy of these vehicles, a diesel engine may be cost effective, as the high purchase price is a trade-off for the engine's durability and reliability. Diesels are not yet as common as gasoline engines in small transit vehicles, but use of diesel for fuel is becoming wide spread. The exact engine chosen, whether it be gasoline or diesel, depends on the weight of the vehicle and the nature of the service for which it will be used.

Approximate Cost:
\$2,500.00 to \$3,000.00 (over and above the cost of a gasoline engine) per diesel engine.

Technical Description:

Vehicle shall be equipped with a diesel-powered drive train with 6.2 Liter minimum diesel engine. Engine heater and dash-mounted pyrometer shall be supplied with all diesel engines.

DRIVER

DELUXE HIGH-BACK DRIVER SEAT

A deluxe high-back driver

Deluxe High-Back Driver Seat

seat provides comfort and safety by reducing driver fatigue.

Approximate Cost: \$250.00 per seat

Technical Description:

The driver seat shall be a fully padded, deluxe high back contoured bucket seat upholstered in vinyl, equipped with horizontal adjustment.

PROTECTIVE SCREEN BEHIND DRIVER

The protective screen behind the driver is a safety



feature, as it prevents the driver from being bumped by passengers and reduces glare from lights in the passenger compartment.

Approximate Cost: \$100.00 per screen

Technical Description:

Two guard rails of stainless steel clad or aluminum tubing shall be provided behind the driver attached to a padded floor to ceiling stanchion, 29" from the wall. The lower rail shall be located directly behind and above the top of the driver's seat; the upper rail shall be 37" above the lower rail. The two rails shall act as a frame for a tinted plexiglass screen 3/8" thick and a minimum of 24" wide.

EMERGENCY EXIT

REAR EMERGENCY EXIT DOOR EQUIPPED WITH WINDOW IN LOWER SECTION

A rear emergency exit door equipped with a window in the lower section increases driver visibility when the vehicle is in reverse; it also enables the driver to see tailgaters that cannot be seen through the rear-view mirror.

Approximate Cost: \$250.00

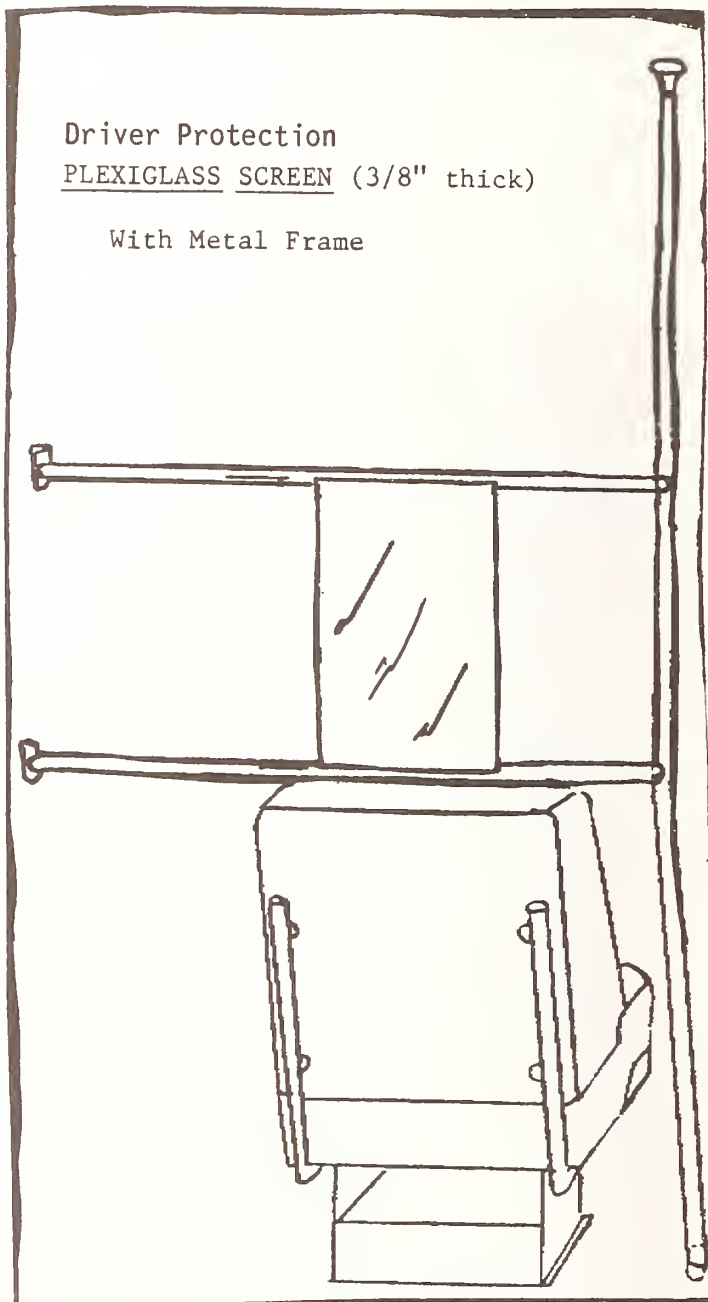
Technical Description:

The rear emergency door shall be equipped with a window of tinted safety glass in the lower section of the door, as to increase visibility for the driver.

ENTRANCES

ENLARGED WHEELCHAIR ENTRANCES

Wheelchair entrances may be enlarged by increasing either the height or width of the doorways. According to some vehicle manufacturers, it is not feasible to make both types of modifications to small transit vehicles. The



Source: Myers Equipment Corporation

most commonly sought modification is increased wheelchair door height to provide safe and ample accessibility for individuals using crutches or walkers; or for vehicle operators assisting wheelchair passengers.

Approximate Cost: In many small transit vehicles, increased wheelchair door height can be provided as standard with no extra costs to the grantee, if requested. For others, an enlarged wheelchair entrance feature may add \$600.00 to \$800.00 to the cost of the vehicle. Discussion with vehicle vendors is advised.

Technical Description: The vehicle shall be equipped with outward opening single or double panel side door(s), for installation of a wheelchair lift. When in full open position, wheelchair lift access door(s) should be firmly fixed in position and provide a clear opening between the floor and the lintel of 67 inches minimum.

FAREBOX

MOUNTED FAREBOX

A mounted farebox increases security, alleviates responsibility of driver to handle money and may encourage donations.

Approximate Cost: \$600.00 to \$800.00 per mounted fare box

Technical Description: A farebox shall be mounted with trip handle toward driver. It shall be mounted on a stanchion, adequately braced, located near the driver and easily accessible to passengers

entering the vehicle. An amber or indirect farebox light shall be connected to the dash instrument lights.

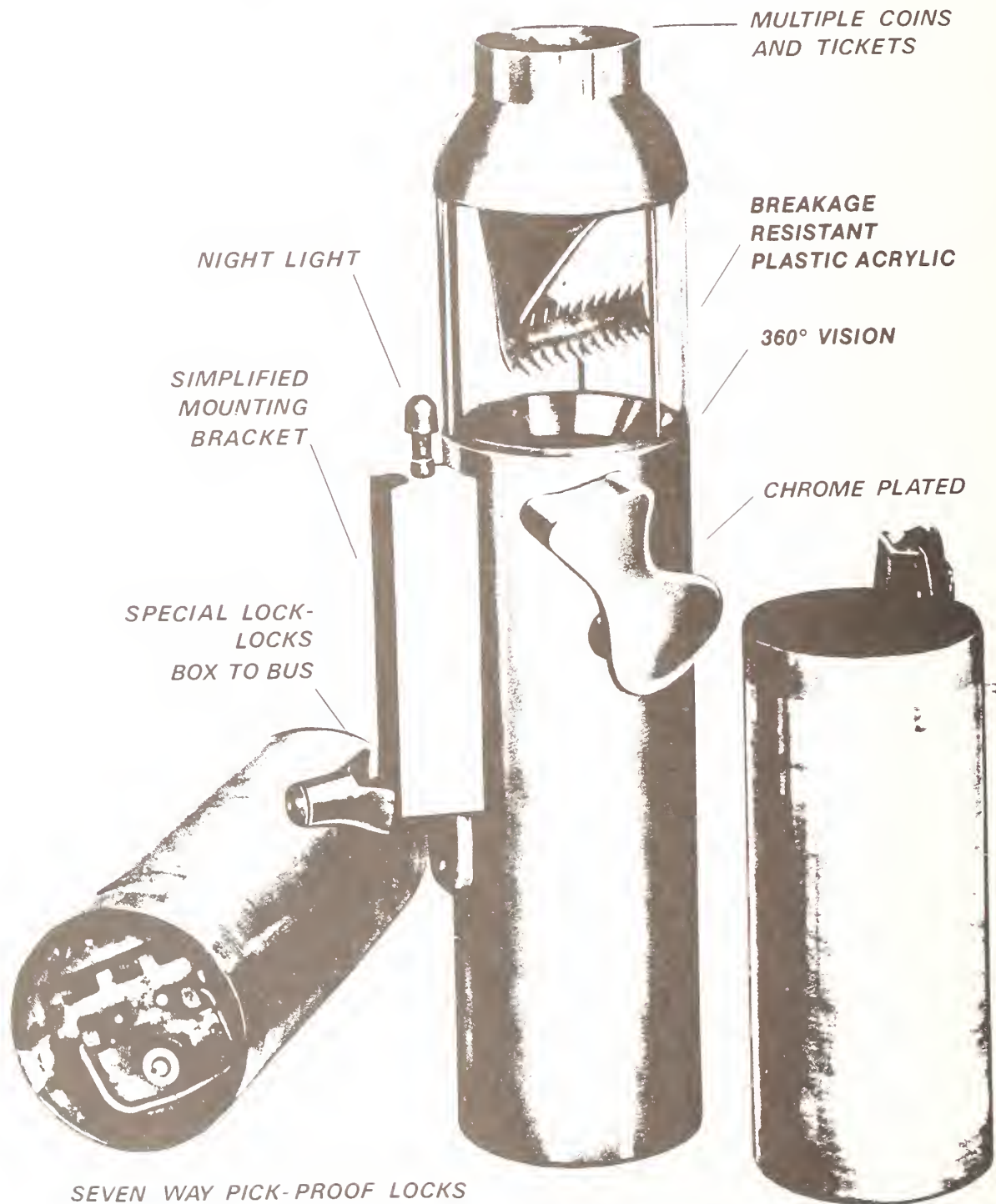
Main Farebox



Source: Division Transportation Systems

Two interchangeable, lockable farebox vaults keyed alike, with a double set of keys for each lock shall be supplied. Farebox shall have the

capability to accept mixed coins, paper currency or tokens, with a capacity of not less than \$200.00 (Main Farebox, Model M4; Diamond Farebox, or approved equal).

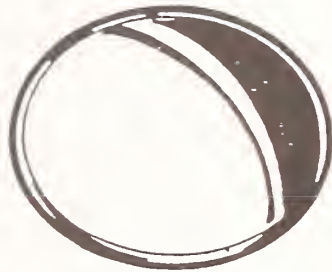


SEVEN WAY PICK-PROOF LOCKS

Convex Mirror Insert

Spot Mirror

- Self adhesive.
- Convex spot mirror.
- 3¾" diameter.



Source: Division Transportation Systems

FUEL TANK

LOCKED FUEL TANK CAPS

Locked fuel tank caps increase security of the vehicle by preventing tampering and/or vandalism.

Approximate Cost: \$25.00

Technical Description:

Vehicle's fuel tank caps shall be equipped with either: 1) locks which may be opened by a driver-operated switch located at the front of the vehicle's

Roof Ventilator/Emergency Exit

- Fresh-air comfort for driver and passengers
- Helps cool the bus in hot weather
- Improves heating/defrosting in cold weather



interior within reach of the driver; or 2) key-type locks, with 2 keys for the lock to be provided with the vehicle.

MIRRORS

CONVEX MIRRORS

Convex mirrors inserted on all outside mirrors as a safety feature, improve the driver's visibility.

Approximate Cost: \$15.00 per convex mirror insert

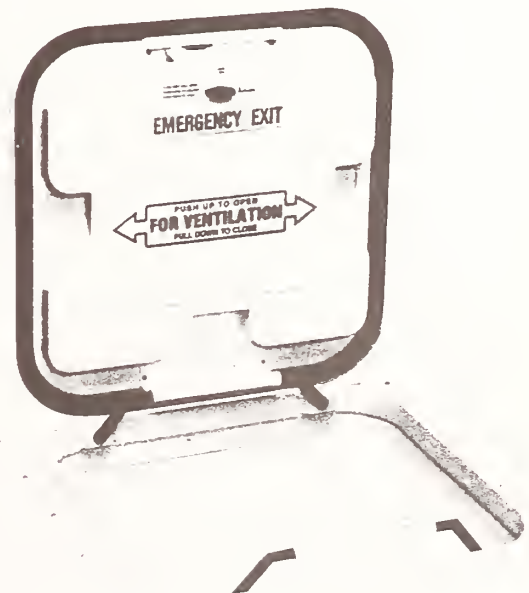
Technical Description:

Convex mirror inserts shall be provided on all exterior mirrors.

ODOMETER

TRIP ODOMETER

A trip odometer measures mileage for vehicle trips, assisting the driver in keeping accurate records.



Approximate Cost: \$75.00

Technical Description:

The vehicle shall be provided with a speedometer with odometer and trip odometer.

ROOF VENT/ESCAPE HATCH

ROOF VENTILATOR/EMERGENCY EXIT

A roof vent provides fresh air comfort for driver and passengers by helping to cool the vehicle in hot weather, and improving heating/defrosting in cold weather. It also provides an added safety feature, as the roof vent can be pushed open for use as an emergency exit.

Approximate Cost: \$500.00

Technical Description: A nonclosing, static exhaust vent, combination roof-ventilator-emergency escape hatch 23" by 23" minimum shall be installed in the vehicle roof which, when open and the vehicle is in a forward motion, shall provide fresh air inside the vehicle. Installation shall be properly sealed to eliminate water leaking into the vehicle. It shall also have an outside release handle with an alarm switch wired to a buzzer that is audible to the driver. All emergency exits shall be marked with instructions for proper use (Transpec Inc., DMA 1122, or approved equal.)

RUNNING BOARDS

RUNNING BOARDS (VANS ONLY)

Running boards ease entrance to and exit from the vehicle for both passengers and the driver, by lowering the height of the vehicle's first

step. This option is recommended for standard vans and mini-vans only.

Approximate Cost: \$150.00 per running board

Technical Description:

Van shall be equipped with running boards on both sides of the vehicle. The running board on the right (passenger) side of the van shall extend from the rear edge of the front wheelwell to at least the rear face of the van's built in step for the side door (a distance of approximately 74" to 85" depending on the van make and model). The running board, or "side" board on the left (driver's) side of the van shall extend from the rear of the front wheelwell to at least the rear of the driver's door opening (a distance of approximately 24" to 35" according to the van make and model). Running boards shall be of one-piece construction.

SIDE STEP RUNNING BOARDS

Extra wide expanded metal electro zinc-plated side running boards for easy access in and out of vans.

- ★ Self-cleaning expanded metal.
- ★ Full side or front door only.
- ★ Available for standard and mini vans.



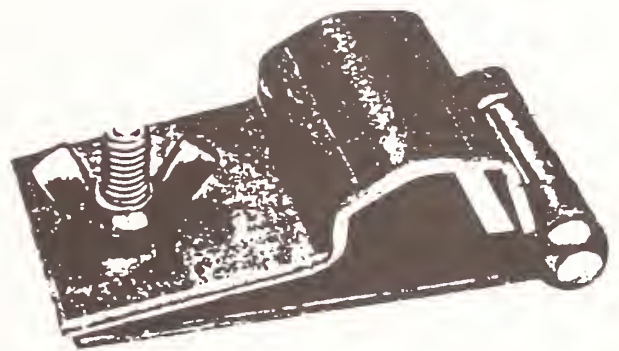
The boards shall have a transverse cross section composed of a vertical flange of 2" at the rear (next to the vehicle body) extending above the horizontal surface, a horizontal surface (tread depth) with a minimum width of 10", and a vertical surface of 2" at the front (away from the van body) extending below the horizontal surface (the dimensions of the transverse cross section surfaces may vary by plus or minus 1/4"). A front splash guard shall be provided for each running board. The running boards shall be made of aluminum material of 1/8" (minimum) thickness. Splash guards shall be made of aluminum material; if the material is less than 1/8" thick, an additional bracket (see below) shall be required at the splash guard ends to ensure adequate structural support of the running board. The horizontal portion of the running board shall have a skid resistant tread surface (e.g. raised diamond pattern, shark's teeth pattern, etc.) or contain longitudinal non-skid strips.

Running boards shall be securely mounted to the side of the van by a combination of horizontal brackets (extending under the boards) and bolts in sufficient quantities to eliminate rattles and to insure strength, stability and safety. A minimum of four brackets shall be used to attach the right board and a minimum of two brackets to attach the left board. The splash guards shall be securely mounted to the van and the running board. Note: On accessible vans where the

wheelchair lift/ramp is located in the side entrance, only one running board shall be placed on the van, located on the driver's side.

Quick Release Seat Brackets

- Set of 4.
- Fits square and round tube frames.
- Wing nut design.



Source: Division Transportation Systems

SEATING

QUICK RELEASE SEATS

Quick release seats contain brackets installed in the vehicle's floor which allow seats to be quickly and easily removed to provide space for a wheelchair passenger, if necessary.

Approximate Cost: \$150.00 per double seat

Technical Description:

All removable seats shall be equipped with a quick release mechanism from flush in-floor tracks that allows easy removal of seats without tools.

SEATING DIAGRAM OPTIONS

PennDOT's technical small transit vehicle specifications provide a standard seating diagram for each type of vehicle discussed. However, grantees have the option of rearranging the seating structure to better accommodate their transit needs. A variety of available seating options are provided in Appendix D. Each is marked to indicate the PennDOT small transit vehicle specification with which it most closely corresponds. It is important to remember that whenever a seating plan is altered, the specs which make reference to it must be revised as well, to accommodate the new seating arrangement. Please notice that the optional seating plans presented here do not include a full bench seat across the rear of the vehicles. Although the rear full bench seat is available and provides additional seating capacity, PennDOT does not recommend it in accessible vehicles. This type of seating arrangement blocks the rear emergency exit door, thus requiring push-out windows or a roof hatch instead, for emergency exit. This type of plan may be impractical for many passengers, especially older and/or physically handicapped passengers who require assistance to move about in the vehicle. In the event of an emergency, exit through the roof or windows may be impossible, or difficult at best for these passengers.

With regards to various seating arrangements, there has also been discussion of the advantages of aisle-facing as

opposed to forward-facing seats. Aisle-facing seats are easier to get into and out of, especially those seats located over wheelwells, and are more comfortable for passengers. On the other hand, passengers tend to dislike riding sideways since acceleration, deceleration and turns may cause discomfort to a side-facing passenger. With the variety of seating options now available, a grantee may specify his preferred seating plan.

Approximate Cost: Varied
Technical Description:

Varied

STEERING WHEEL

TILT STEERING WHEEL

A tilt steering wheel provides the driver with comfort and convenience, as it enables different sized drivers to be easily accommodated.

Approximate Cost: \$175.00
Technical Description:

The vehicle shall be equipped with factory-installed, driver controlled, tilting steering wheel.





ALL SEASON STEEL BELTED RADIAL

- ☐ **2 Full Steel Belts** — Protection against penetration and bruises.
- ☐ **Polyester Cord Body** — Durable and smooth ride.
- ☐ **M/S Rated** — For year round performance.
- ☐ **LRR Tread Compound** — Low Rolling Resistance for fuel economy.
- ☐ **WSW Styling** — Attractive modern appearance.
- ☐ **Aggressive Tread Design** — Outstanding traction for driving in all conditions.

TIRES

ALL WEATHER RADIAL TIRES

Tires for small transit vehicles are generally available in two types of construction - bias-ply and radials. There are three type of radial tires, but the most commonly used is all weather radials. While PennDOT specifies radial tires for all vans, all weather radials are not required in the technical specifications for larger vehicles, such as body on chassis and small buses. For these vehicles, a grantee may

choose all weather radial tires as an optional feature.

Radial tires have several advantages over normal bias-ply tires. In general, radials have been proven to offer improved fuel economy, last longer and give a smoother ride. They also offer more retreads per casing. Radial tires are, however, more expensive to purchase and require careful attention when inflating, as

there is less margin for error than on a bias-ply tire.

In tire selection, much depends upon the operating environment. If it is found that tire casings are being destroyed by pot holes, vandalism or curb damage before they wear out, radials may not be an appropriate choice. However, if the tires are expected to wear out instead of having a casing failure, all weather radial tires are very likely a good, cost-effective choice.

Approximate Cost: \$600.00
per four tires and one spare

Technical Description:
Vehicle shall be equipped with all weather radial tires including one spare tire.



Dual tow hooks

Source: Carpenter Body Works

TOWING

TOWING HOOKS

Towing hooks provide a safe, convenient connection which enables the vehicle to be

towed if it should become necessary.

Approximate Cost: \$75.00
per set of two hooks

Technical Description:
Vehicle shall be provided with two sets of towing hooks - one set in front and one set in the rear of the vehicle. The towing hooks shall be mounted to the vehicle frame and adequately braced and shall be installed so that the vehicle can be safely towed without damage to the vehicle body, frame and bumpers. The towing hooks shall be of sufficient strength to tow at least one and a half times the GVW rating of the vehicle.

WARNING SYSTEMS

BACK UP WARNING DEVICE

A back up warning device is a safety feature, alerting people that the vehicle is moving in the reverse direction. The device emits an audible signal when the transmission is in reverse.

Approximate Cost: \$100.00

Technical Description:
Vehicle shall be provided with a back up warning device that is readily audible outside the vehicle when transmission is in reverse. The warning device shall be mounted in the rear of the vehicle.

WHEELCHAIR

INTERNATIONAL WHEELCHAIR ACCESSIBILITY SYMBOL

The international wheelchair accessibility symbol indicates that a vehicle is



(Blue and White)

International Wheelchair Accessibility Symbol

Source: Reference No. 8

equipped with a wheelchair ramp or lift system and is accessible to persons in wheelchairs. The wheelchair accessibility symbol may be located directly on the vehicle, at vehicle stops, and/or in advertisement displays.

Approximate Cost: \$10.00 per symbol

Technical Description:

(For accessible vehicles only)
The international wheelchair accessibility symbol shall be affixed to the outside of the vehicle body at both of the following locations: 1) at the lift, either on one of the doors to the lift entryway or immediately next to one of those doors, and 2) on the

rear of the vehicle. The international wheelchair accessibility symbol shall be that symbol depicted on sign D9-6 in the "Manual of Uniform Traffic Control Devices" published by the Federal Highway Administration of the U.S. Department of Transportation. The symbol provided shall be between 5" and 12" in overall height.

Rear of Vehicle Wheelchair Lift



Source: Braun Corporation

WHEELCHAIR LIFTS AND RAMPS

OPTIONAL LIFT AND RAMP LOCATIONS

PennDOT's standard specifications have wheelchair lifts and ramps located on the side doors of vehicles and stored in their interiors. However, depending upon the operating environment (both climate and service route), ramp and lift installation and storage in alternate locations on the vehicle may be practical in some cases. The following are options for wheelchair lift and ramp locations:

International Wheelchair Accessibility

Symbol displayed on vehicle side



Source: Rohrer Bus Sales, Inc.

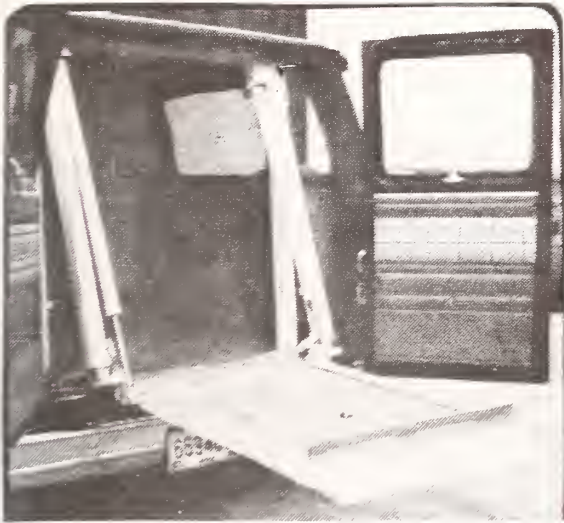
REAR OF VEHICLE LIFT OR RAMP LOCATION

Locating a wheelchair lift or ramp in the extreme rear door of a vehicle is beneficial since this location does not block the vehicle's side door exit. The rear door location is advantageous in rural areas where roadside ditches, tall grass and/or heavy snow restrict curbside access. It may also be beneficial on one-way streets and narrow driveways where side access space is limited.

Approximate Cost: Same as standard lift or ramp price. There is no additional cost for lift location in the extreme rear door of a vehicle. Discussion with vendors is advised.

Technical Description (Wheelchair lift): The wheelchair lift shall be installed in the extreme rear of the vehicle with a minimum of structural body modifications. The cutting of chassis structural members is prohibited. All changes required to the basic body structure shall provide for

Rear of Vehicle Wheelchair Lift



Source: Reb Manufacturing, Inc.

adequate reinforcing and load distribution. The installation shall be adequate to withstand the stresses imposed by regular lift operation on a sustained basis. A rear mounted wheelchair lift shall meet all lift specifications in the wheelchair lift section of this IFB.

Technical Description
(Wheelchair ramp): The wheelchair ramp shall be constructed and installed in the extreme rear of the vehicle with the minimum of structural body modifications.

The ramp supports shall be permanently bolted to the inside of the vehicle at the rear door(s). When folded up in its storage position, all components of the ramp mechanism shall be located inside the vehicle and it shall be possible to close the rear door(s) of the vehicle. The ramp shall be secure and stationary when folded in its storage position with the rear door(s) closed. A rear mounted wheelchair ramp shall meet all the ramp specifications in the wheelchair ramp section of this IFB.

PASSIVE WHEELCHAIR LIFTS

Unlike active wheelchair lifts, which require an additional entrance for wheelchair passengers, passive wheelchair lifts can be stowed without impeding regular vehicle entrances. When stowed, a passive lift provides steps for passengers. When operational, it forms a platform that lifts a wheelchair from the ground to the level of the vehicle floor. Passive wheelchair lifts may be more convenient than active lifts and increase interior space and seating capacity on the vehicle, as only one passenger entrance is required. However, the installation of passive lifts is more complicated than that of active wheelchair lifts. A widened vehicle entrance is required for passive lift installation which generally delays factory delivery of the vehicle.

Approximate Cost:
\$8,000.00 (\$4,500.00 to \$6,000.00 over and above the cost of a "standard" active wheelchair lift.)

Technical Description:
The vehicle shall be equipped with a passive wheelchair lift incorporated into the front passenger stepwell such that able-bodied passengers can board the vehicle in a normal manner. The ground to first step shall be a minimum of 14". Each additional vertical step shall 9" maximum, except the second step, which shall be 10¹/₂" maximum. All tread depths shall be a minimum of 8¹/₂". Step width shall be a minimum of 32".

Loading of wheelchairs

Passive Wheelchair Lift



Source:



MANUFACTURING, INC.

shall be accomplished by a power mechanism which converts the stepwell into a platform, and raises and lowers the lift (REB Manufacturing, Inc., Two-In-One Lift; or approved equal.)

WINDOWS

SIDE WINDOW ON ROOF CAP (RAISED ROOF VANS ONLY)

A side window on roof caps provides ventilation/fresh air

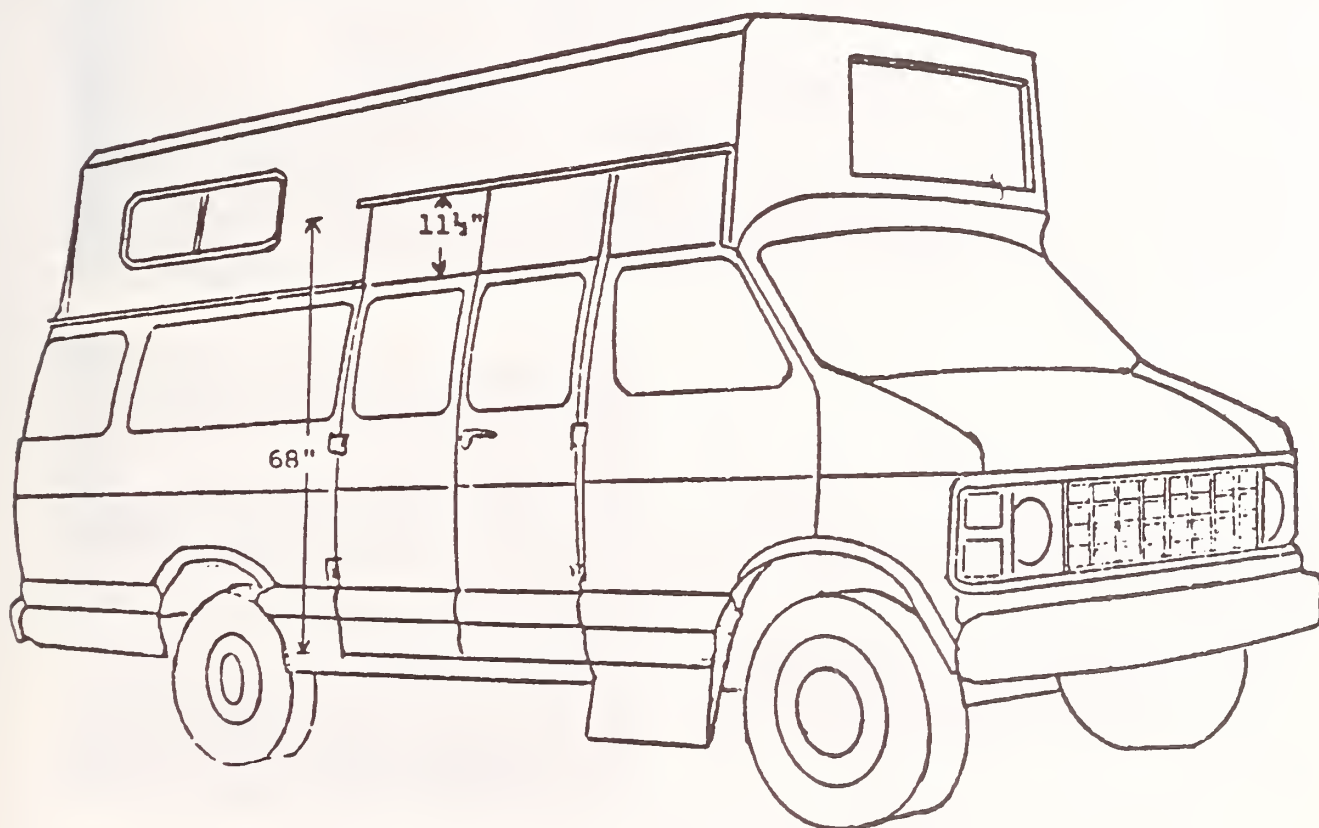
comfort for the van's passengers and driver; also helps to cool the van in hot weather and improves effectiveness of the defroster in cold weather.

Approximate Cost: \$200.00

Technical Description:

The van's extended roof shall be equipped with windows on both sides of the vehicle. Windows shall contain tinted safety glass and be easily replaceable. The frames shall be anodized aluminum, rust resistant, horizontal slide type. They shall slide freely

Raised Roof Van with Side Windows on Roof Cap



Source: Reference No. 8

and quietly with minimal effort. The frame shall have a locking device to latch the window in closed position. Windows shall be securely mounted to the structure of the roof cap and windows shall not rattle when open or closed.

**WINDSHIELD WIPER WITH
INTERMITTENT FEATURE**

A windshield wiper with

intermittent feature is a safety feature which improves driver visibility in light precipitation or fog. It also prolongs the useful life of the windshield wipers.

Approximate Cost: \$100.00

Technical Description:

The vehicle shall be equipped with a two-speed wiper/washer control with intermittent wiper feature.



Source: Rohrer Bus Sales, Inc.



Source: Turtle Top, Inc.



Source: Myers Equipment Corporation

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GLOSSARY

Accessibility - Freedom of a transit system from barriers preventing travellers from using that system.

Active Wheelchair Lifts - Also known as "platform lifts" or "lift gates," these devices are currently the most commonly used wheelchair lifts, usually requiring an entrance separate from the regular passenger door.

Bid - A statement of what vehicle a supplier will sell to the buyer and at what price.

Bid Bond - A guarantee that the bidder will sign the contract (IFB) if awarded the project.

Body on Chassis Construction - A vehicle design feature and a method of manufacture in which the chassis and body of the vehicle are built as separate units and joined together to form the completed vehicle. Chassis and body of the same vehicle are commonly built by different companies and in different plants. School buses and many small transit vehicles are body on chassis vehicles. See also "integral construction."

Bond Forms - Bonds provide collateral against a bidder's failure to perform. There are 2 types in common use - bid bonds and performance bonds.

Bus Body - The portion of a bus that encloses the bus' occupant space, exclusive of the bumpers, the chassis frame, and any structure forward of the forwardmost point of the windshield mounting.

Carrying Capacity - The payload or maximum weight the vehicle can accept, usually GVW minus curb weight.

Chassis - The frame and working parts of the vehicle such as the engine, transmission, suspension, axles, steering gear and brakes.

Curb Weight - The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil and coolant, and, if so equipped, air conditioning and additional weight optional engine.

Demand-Responsive Service - Characterized by flexible routing and scheduling to provide shared occupancy on demand, often with door-to-door service. Often provided for people whose mobility is limited.

Drivetrain - The group of components used to transmit engine power to the wheels. The drivetrain includes the clutch,

transmission, universal joints (U-joints), drive shafts, and drive axle gears and shafts.

Forward Control Chassis - A front engine chassis on which the driver's controls are placed above or in front of the front axle.

Front End Documents (Boiler Plate) - Consist of the following: Instructions to Bidders - details the bid process, including qualifications expected of bidders, data to be submitted with bid, how a bidder can request clarification or addenda, etc.; General Provisions - details the role of buyer and supplier in the contract concerning items such as payment, delivery, inspection, termination of contract, and warranty provisions; Bid Forms - Forms that must be properly completed by the vendor and submitted as part of his bid; Protest/Dispute Procedures - Outlines steps to be taken in the event of any protests/disputes that may arise prior to or following the bid opening.

Gross Vehicle Weight (GVW) - The maximum allowable fully laden weight of the vehicle and its payload. It is the most common classification criteria used by manufacturers and by states for transit vehicles.

Integral Construction - A vehicle design feature and a method of manufacture in which a single structure serves as both chassis and body of the vehicle. The most important advantage of integral construction is its greater rigidity-to-weight ratio which permits a strong body with a larger seating capacity for a given weight than body on chassis construction. Low floor height may also be easier to achieve, since the heavy chassis frame rails associated with body on chassis construction are not necessary. Large transit buses and intercity buses, as well as small purpose built buses are usually integral construction vehicles. See also "body on chassis" construction.

Invitation for Bids (IFB) - The entire contract document on which vendors base their bids. It consists of front-end documents and technical specifications.

Life Cycle Costs - All costs associated with a vehicle's useful life (i.e. acquisition, operating, and maintenance costs).

Modified Van - Standard van with some body and/or chassis modification.

Paratransit - Flexible transportation services, operated publicly or privately. Typically, small scale operations using low-capacity vehicles closely related to public transportation, i.e. dial-a-ride, shared-ride taxi, carpools, vanpools and subscription buses.

Passive Wheelchair Lift - Also called "step lifts," this equipment can be stowed without impeding regular vehicle entrances. When stowed, a passive wheelchair lift provides steps for passengers. When operational, it forms a platform that lifts a wheelchair from the ground to the level of the vehicle floor.

Performance Bond - The approved form of security, furnished by the Contractor and the surety, as a guaranty on the part of the Contractor to execute the work, in accordance with the terms of the specifications and contract.

Preventive Maintenance - Maintenance program based on regularly scheduled inspections rather than on emergency repairs necessitated by vehicle breakdowns.

Service Area - The geographical area within which transportation service is offered.

Small "Purpose Built" Bus - Bus whose chassis and body are designed as an integral unit durable in transit service.

Small Transit Vehicle - Vehicle smaller than the 35 or 40 foot standard transit bus.

Stanchions and Grab Rails - Handles installed at a vehicle's entrances and throughout the vehicle (attached to its ceiling and walls) to assist elderly and/or mobility impaired passengers.

Standard Van - Type of van available from automotive manufacturers.

Tandem (Tag) Axle - Two axles operated from a single suspension.

Technical Specifications - That part of the contract which determines the actual components, construction and performance requirements of the vehicles. Specifications can be phases or drawings.

Van Cutaway Chassis - An automobile van which is sold without any body behind the front seats and doors.

Wheelbase - The distance between the centerlines of the front and rear axles or, if tandem, the distance from the centerline of the front axle to a point midway between the two rear axles.

Wheelchair Lift - Device which lifts a wheelchair user from ground level to the level of the vehicle floor so that the user can wheel onto the vehicle. See Active Wheelchair Lift and Passive Wheelchair Lift.

Wheelchair Ramp - Available with steps, cleats, runners and

plain surfaces, this device can be portable or permanently mounted on vehicles to enable passengers in wheelchairs to enter the vehicle.

Wheelchair Securement - Device which holds a wheelchair, and sometimes its occupant, in place within a vehicle. Also known as a wheelchair restraint or tie down. There are two principal types of wheelchair securement devices - wheel locks and tie downs. In general, wheel locks lock one or both rear wheelchair wheels in place. With tie downs, a belt or bar attaches to the wheelchair and connects to the floor or wall of a vehicle by means of a track system or mounts.

APPENDIX A

ACCESSIBILITY EQUIPMENT

Many small transit vehicles in service today provide transportation to elderly and mobility impaired passengers, who may require assistance to enter/exit the vehicle. For these passengers who cannot use steps, there are two basic boarding devices—wheelchair lifts and ramps. A vehicle equipped with such a device is referred to as

"accessible". A procurement agency purchasing an accessible vehicle needs to consider the trade-offs between the benefits that lifts and ramps provide, and the impact they have on purchase, operation and maintenance costs. The boarding device most commonly installed on accessible vehicles is a wheelchair lift. There are two major types of lifts: electromechanical lifts, which operate using belts, chains or cables; and electrohydraulic lifts, which use cylinders of fluid (fluid pressure) to operate. PennDOT small transit vehicle technical specifications permit either type, as long as



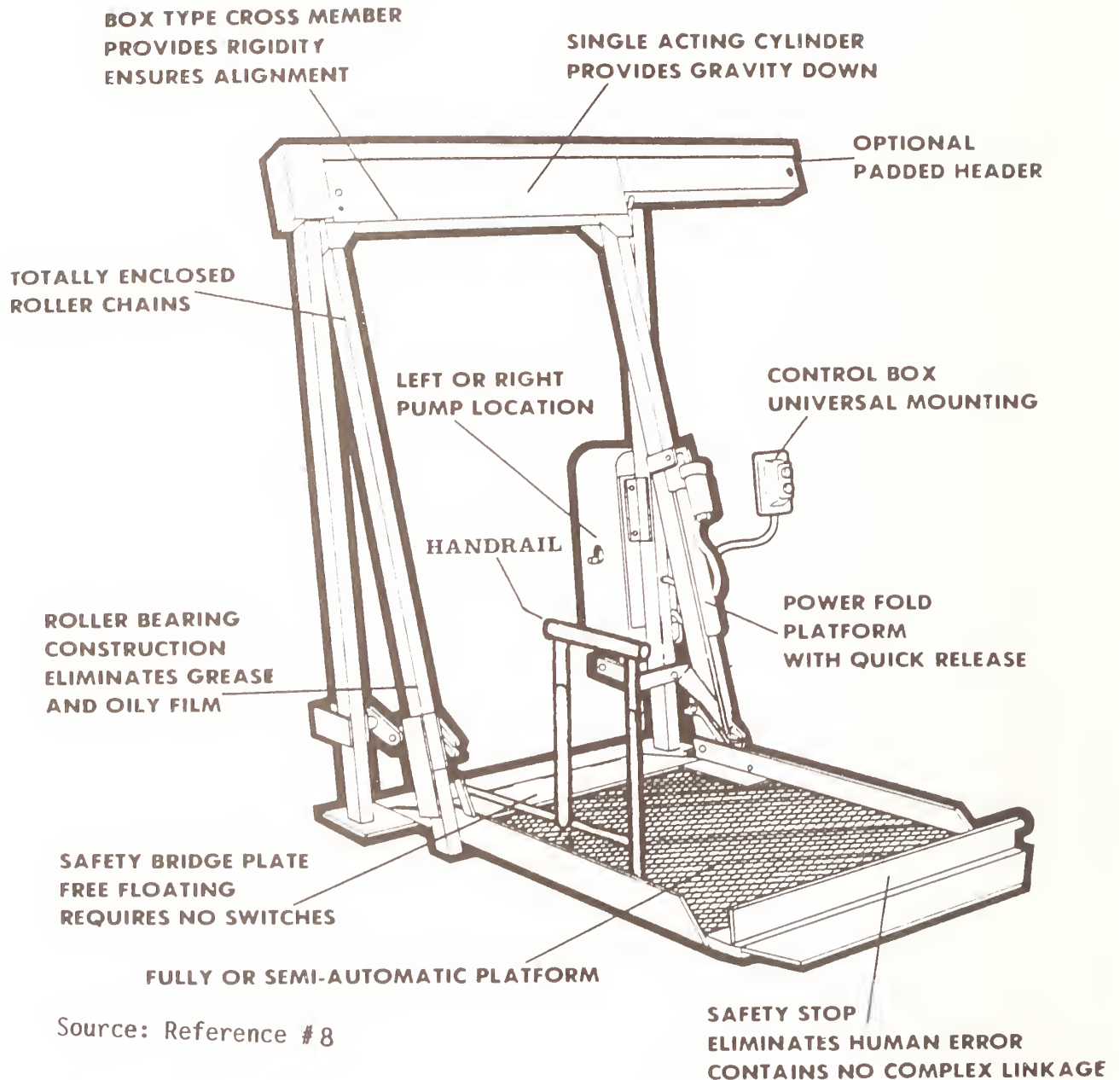
An electro-hydraulic lift makes entry and exit of wheelchair passengers safe and convenient for them . . . easy for you.

Source: Rohrer Bus Sales, Inc.



Source: El Dorado Motor Corporation

Figure A.1 **DIAGRAM OF BRAUN LIFT**



Source: Reference #8

the system also allows for manual operation of the lift (by means of a hand crank or hand-powered pump) in the event of an electrical failure.

A lift permits access for a wheelchair user by first lowering a platform to ground level, allowing the user to

wheel onto the platform, and then raising the platform to the same level as the vehicle floor so that the user can wheel into the vehicle. Some systems permit semi-ambulatory passengers to use a lift while they are standing. Lifts may be "active" or "passive". Active lifts, (see Figure A.1)



also known as "platform lifts" or "lift gates", usually require an entrance separate from the regular passenger door. This is because the stowed lift may interfere with the use of the entrance. When being raised or lowered, an active lift operates primarily outside the body of the vehicle. Passive wheelchair lifts, also called "step lifts" can be stowed without impeding regular vehicle entrances. When stowed, a passive lift provides steps for passengers. When operational, it forms a platform that lifts a wheelchair from the ground to the level of the vehicle floor. Passive lifts are a relatively new and very expensive feature, and their high costs discourage many grantees from purchasing them. Because of this, passive lifts are currently not included in the PennDOT standard specs. However, they are an optional feature addressed in Part 2 of this manual and more information on passive lifts may be found there.

The location of the lifts is another important



Source: Welsh Equipment Company, Inc.

consideration. Lifts may be mounted on side or rear doors. Generally, lifts are installed in the vehicle's side and stored in its interior, as indicated in the PennDOT standard specs. However, depending upon the operating environment (both climate and service route), lift installation in alternative locations on the vehicle may be practical. Lift location is affected by service route. In urban areas where curbside pickups are frequent, a side door (as opposed to a rear door) mounted lift is usually preferred. This lowers the risk of the lift being struck by another vehicle in a rear end collision, and is easily accessible and safer for passengers. For rural service routes where roadside ditches, tall grass and/or heavy snow replace curbside access, lift storage is more convenient on the vehicle's rear entrance. Also, on one way streets and narrow driveways rear mounted lifts are generally better, since there is no lift



protrusion on the side of the vehicle. There are obviously advantages and disadvantages of any lift locations, and it is always a good idea to consider them as part of the accessible vehicle selection process.

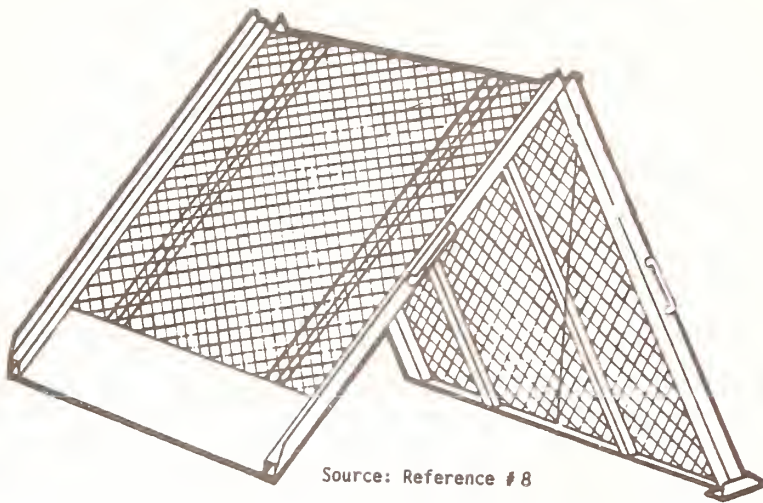
While wheelchair lifts are a convenient feature to have on vehicles, they may be expensive to acquire and utilize (See Table A.1). Adding a lift to a vehicle requires additional training and/or tools for maintenance mechanics; calls for increased driver training; reduces seating capacity (with interior storage); increases the amount of time spent at stops; and adds weight to the vehicle, creating higher fuel expenses.

A less expensive option is a wheelchair ramp (See Figure A.2). There are fewer commercially available ramps than there are lifts. Ramps are often designed and made by individual vehicle suppliers to fit into their own vehicles. Ramps cost less than lifts (See Table A.1), are installed more easily, operate more simply, & require less maintenance. In PennDOT's small transit vehicle technical specifications, ramps are attached to the inside of the vehicle's side door. They are stored in a folded vertical position inside the vehicle. As with wheelchair lifts, ramps may be located in alternative positions in the

TABLE A.1

PRICE RANGES FOR WHEELCHAIR BOARDING DEVICES

TYPE	PRICE RANGE IN 1988 DOLLARS
Ramp	\$ 500.00 to 600.00
Electromechanical Lift	
Automatic	\$3,000.00 to 3,500.00
Semi-Automatic	\$2,000.00 to 2,500.00
Electrohydraulic Lift	
Automatic	\$3,000.00 to 3,500.00
Semi-Automatic	\$2,300.00 to 2,800.00



Source: Reference #8

vehicle. Part 2 of this manual should be consulted for additional information on optional wheelchair ramp locations.

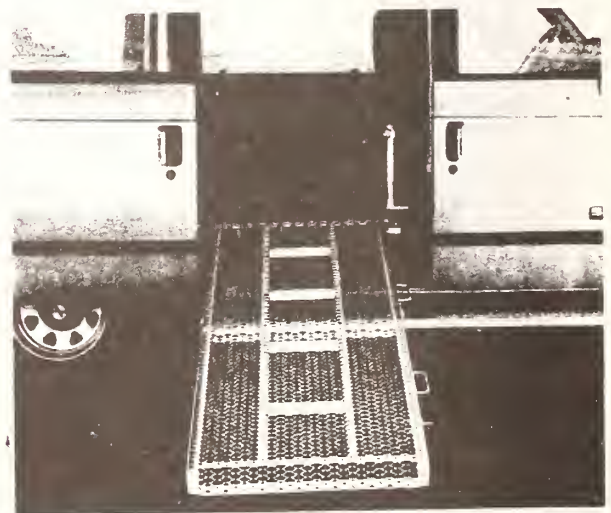
Generally, ramps are operated manually. The driver must not only fold and unfold the ramp, but also assist wheelchair passengers up the ramp and into the vehicle. Often the ramp is angled at a steep incline, requiring driver strength to push the wheelchair up the ramp. This has caused back injuries among some drivers and may entirely restrict potential drivers lacking the required strength.



Also, passengers using walkers, canes or crutches may have difficulty walking on an incline. If these passengers cannot board the vehicle through another entrance, it may be necessary to use a boarding chair (a folding wheelchair).

Another disadvantage of ramps is that they can become slippery in wet weather. Although this may happen with lifts as well, it is more of a problem with ramps since the assistant may also slip.

Making the choice between a wheelchair lift and a ramp is an important consideration for a procurement agency. Lifts are more convenient and far more common, especially when wheelchair passengers are frequent riders. For this type of route, a lift would likely be a good investment. If a boarding device is needed for occasional use only, it may not only be less expensive, but easier overall to purchase a ramp-equipped vehicle.

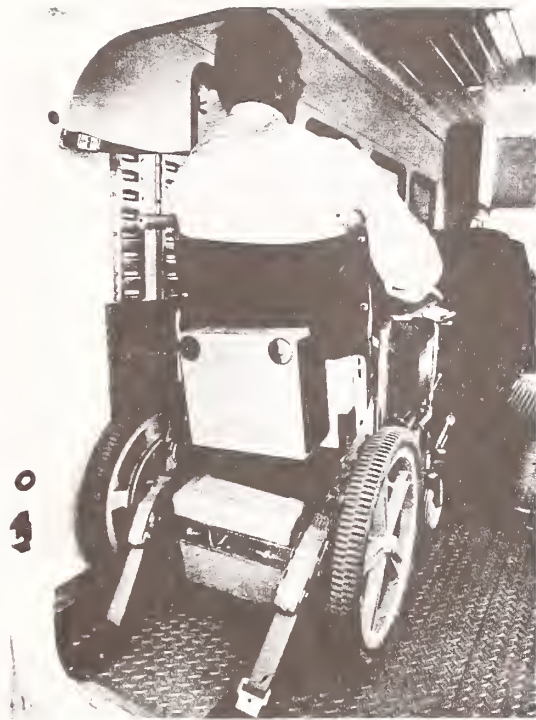


DEPLOYED

Figure A.3

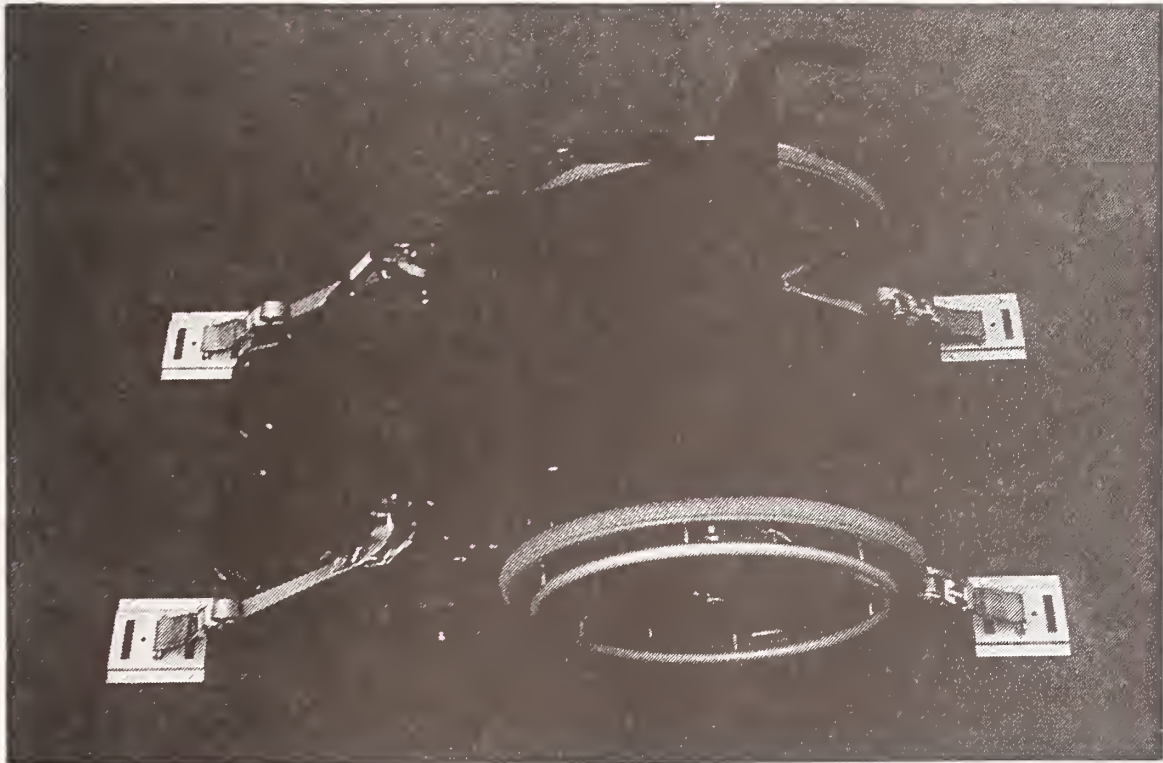


FRONT



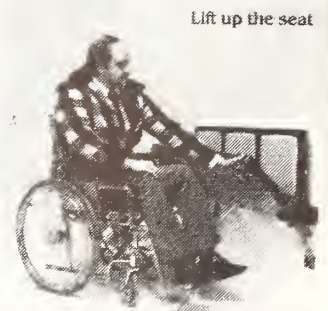
BACK

Source: Q'Straint



The 4 POINT TRACK/BELT TIE-DOWN

Source: Braun Corporation



Source: American Seating

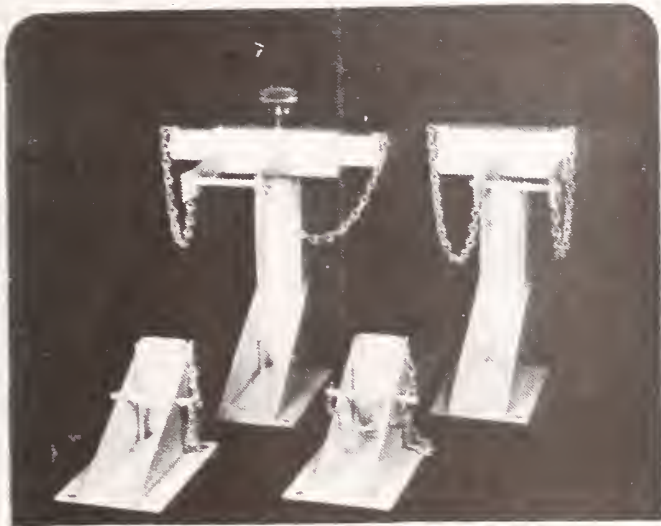
After boarding the vehicle, the wheelchair passengers must be secured to assure safe transport. Wheelchair securements, also called restraints, are devices located inside the vehicle and attached to the vehicle in order to hold a wheelchair and its occupant in place while the vehicle is moving, or during a



sudden stop or accident. This is done in order to protect both the wheelchair occupant and the other passengers.

There are two principal types of wheelchair securement devices - tie downs and wheel locks. Both types are included in the PennDOT small transit vehicle technical specs, and grantees may select their personal preference. Tie downs, or belt-channel/track systems, include a belt which attaches to the wheelchair and connects to the floor or wall of the vehicle by means of track systems or mounts. PennDOT specifies two four-point belt-track system models - Aeroquip and Q'Straint (or approved equals). While these systems are very similar, there is one major difference between the two: Q'Straint provides a lap/shoulder belt and Aeroquip does not. Both models, however, have met the necessary safety requirements

Figure A.4



Source: REB Manufacturing, Inc.

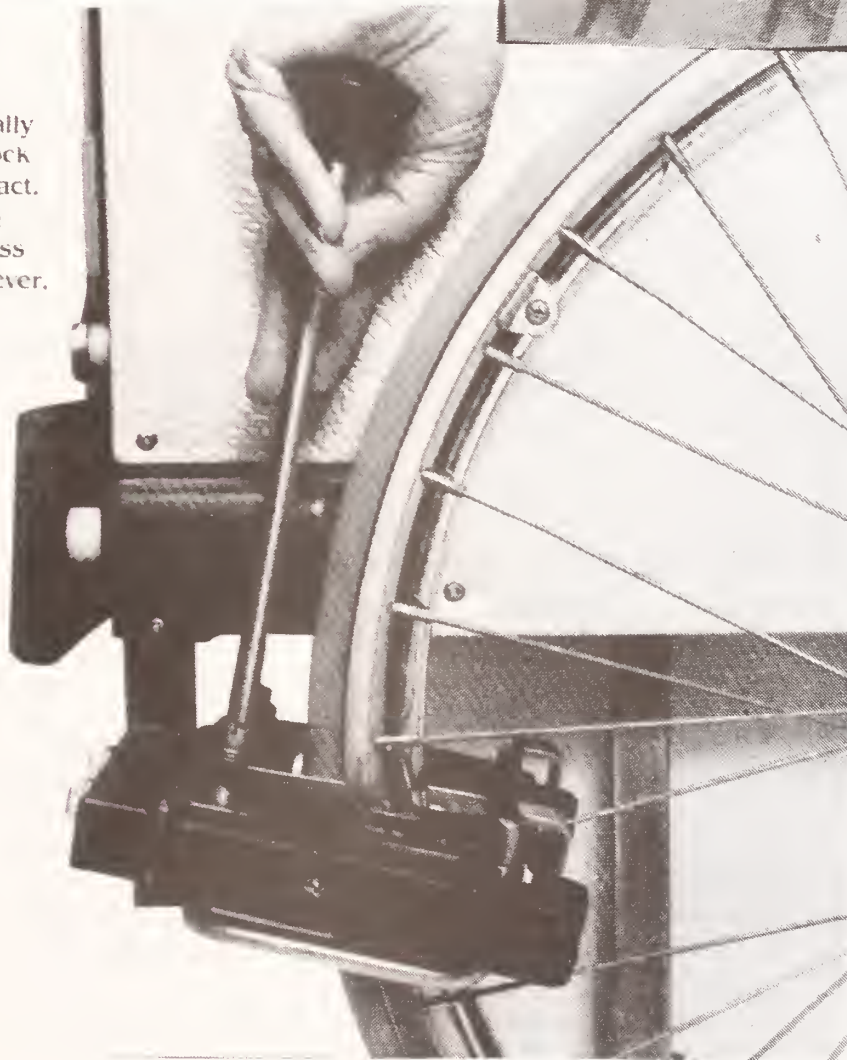


These Tie Downs may easily be cut apart and spaced further apart for special applications, or to be used as a single Tie Down.

Source: Braun Corporation



Wheel automatically engages lock upon contact. To release: Simply press down on lever.



Source: American Seating

of holding wheelchairs and their passengers securely in place (See Figure A.3). Wheel locks, or wheelchair lock systems, are brackets bolted into the floor of the vehicle. A wheelchair is backed into the brackets, which clasps onto the rear wheels, locking them in place (See Figure A.4).

Most securement devices are operated manually. The design and location of the securement, and the disabilities and dexterity of the wheelchair user, affect the amount of driver assistance necessary to apply a securement device. According to some transit experts, tie downs, when properly used, are the "safest" wheelchair securement systems, because they attach

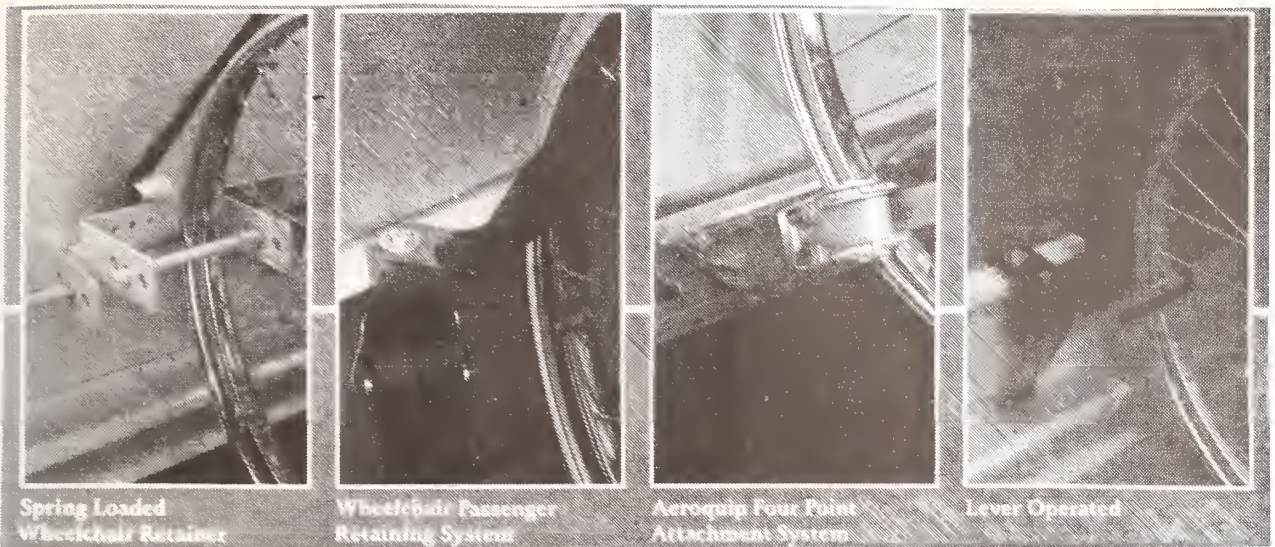
to the frame, rather than wheels of a wheelchair.* Since the frame is sturdier than the wheels, the wheelchair would be less likely to become disjointed in the event of a collision. However, care should be taken to ensure that tie downs are always properly fastened by vehicle operators. This may be time consuming and inconvenient and, unfortunately, operators may sometimes be haphazard in this task. While tie downs may offer greater securement, wheel lock systems provide convenience, as they are relatively quick and easy to use, and less expensive. (See Table A.2).

* Source: Reference No. 5

TABLE A.2

PRICE RANGES FOR WHEELCHAIR SECUREMENT DEVICES

TYPE	MANUFACTURER	PRICE RANGE IN 1988 DOLLARS
Lock system (wheellocks)	Collins, Saf-T-Lock (or approved equal)	\$ 175.00 to 250.00 per wheelchair position
Belt-Track System	Aeroquip Corporation (or approved equal)	\$ 200.00 to 300.00 per wheelchair position
Belt-Channel System	Q-Straint Corporation (or approved equal)	\$ 350.00 to 500.00 per wheelchair position



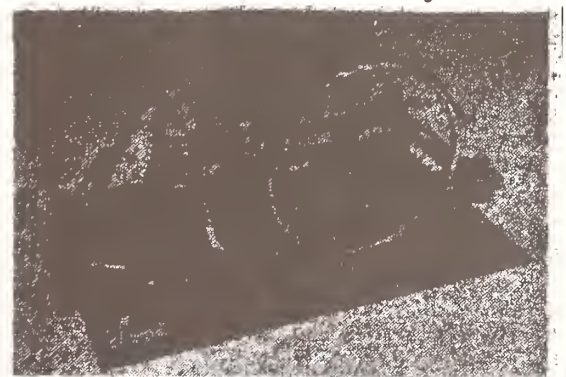
Source: Carpenter Body Works

One problem identified by operators is that not all wheelchairs can be secured to all wheelchair restraints. The types and sizes of wheelchairs is continually growing, as the market is becoming more specialized. Although wheelchair securement devices are adjustable, differences in width of the tires or in the types of wheels may make attaching the restraints difficult. To assure that proper securement devices are specified, a grantee should discuss their wheelchair securement needs with potential vendors when preparing the IFB.



Source: Carpenter Body Works

As a grantee prepares to select an accessible small transit vehicle, he may request any of the wheelchair securement devices described above. A combination of types is also an option, if it best serves the grantee's transit needs.



The Rear Wheel Tie Down may also be used in combination with the Braun Two Point Track Belt System Source: Braun Corporation

APPENDIX B

PennDOT BID FORMS

SMALL TRANSIT VEHICLE LISTING

Technical specifications for the vehicles described below are available to Section 18, 16(b)(2) and 406 grantees from the Pennsylvania Department of Transportation upon request. The list includes station wagons, standard vans and van conversions, and small transit buses ranging from eleven to twenty-eight passenger capacities. Each vehicle type with the exception of the station wagon is available in a wheelchair accessible version either through the use of a lift or ramp.

Upon receiving a technical specification request, PaDOT will send the grantee a complete Invitation For Bids (IFB) package, along with bidding procedures that must be strictly adhered to by the grantee. The IFB includes six sections:

- (1) Instructions to Bidders
- (2) General Provisions
- (3) Technical Specifications
- (4) Bid Forms
- (5) Protest Procedures (Attachment "A")
- (6) Dispute Procedures (Attachment "B")

Upon receipt of the IFB package, the grantee may select to change parts of the IFB or to make no changes. In either case, prior to advertising and distributing its IFB to potential bidders, the grantee must submit a complete IFB package to PaDOT for final review and approval.

<u>Code</u>	<u>Vehicle Description</u>
Spec C	Seven (7) Passenger Mini Van
Spec D	Eight (8) Passenger Standard Van
Spec E	Twelve (12) Passenger Standard Van
Spec F	Fifteen (15) Passenger Standard Van
Spec G	Small Station Wagon
Spec H	Mid-Size Station Wagon
Spec I	Full-Size Station Wagon
Spec J	Sixteen (16) Passenger Small Transit Bus
Spec K	Twenty (20) Passenger Small Transit Bus
Spec L	Twenty-four (24) Passenger Small Transit Bus
Spec M	Twenty-eight (28) Passenger Small Transit Bus
Spec N	Enclosed 4-Wheel Drive Truck
Spec A/B-Lift	Accessible Nine (9) Passenger Van
Spec A/B-Ramp	" " " " " "
Spec A/C-Lift	Accessible Nine (9) Passenger Raised Roof Van
Spec A/C-Ramp	" " " " " "
Spec A/J-Lift	Accessible Eleven (11) Passenger Small Transit Bus
Spec A/J-Ramp	" " " " " "
Spec A/K-Lift	Accessible Fifteen (15) Passenger Small Transit Bus
Spec A/K-Ramp	" " " " " "
Spec A/L-Lift	Accessible Nineteen (19) Passenger Small Transit Bus
Spec A/L-Ramp	" " " " " "
Spec A/M-Lift	Accessible Twenty-three (23) Passenger Small Transit Bus
Spec A/M-Ramp	" " " " " "
Spec A/Z	Accessible Mini Van (Ramp Equipped)
Spec A/Z-1	Grand Accessible Mini Van (Ramp Equipped)
Spec A/Z-2	Accessible Mini Van with Rear Passenger Entrance (Ramp Equipped)
Spec A/Z-3	Grand Accessible Mini Van with Rear Passenger Entrance (Ramp Equipped)

Requests for technical specifications must be submitted to:

Scott Casper, Director
 Bureau of Public Transit
 1215 Transportation & Safety Building
 Harrisburg, PA 17120
 Attention: Capital Grants Section

Harrisburg, Pennsylvania 17120

Subject: _____

IFB Number: _____

Dear _____:

Thank you for requesting the enclosed Invitation for Bids (IFB) for your small transit vehicle procurement. Your total IFB package must consist of five sections:

- (1) Instructions to Bidder (Section A)
- (2) General Provisions (Section B)
- (3) Technical Specifications (Section C) including the seating diagram (Figure 1)
- (4) Bid Forms (Section D)
- (5) Protest Procedures (Attachment "A") and Dispute Procedures (Attachment "B")

Potential bidders must receive the total IFB package. Prior to distributing your IFB to potential bidders and advertising for bids, you must receive PaDOT written approval of your IFB. Send your entire IFB package to this office accompanied by the "Request Sheet for Changes/Additions to IFB Package" (enclosed). This sheet must indicate which sections of PaDOT's standard IFB you have changed and provide justification for the changes. Even if you have made no changes, this submission for PaDOT prior approval is still required. Please make reference to the IFB number noted above in all future correspondence concerning this procurement.

Also find enclosed the "Mandatory Competitive Sealed Bidding Procedure" and a listing of small transit vehicle vendors. Strict adherence to the bidding procedure is required unless granted a written exemption from this office. The vendor listing is for your information only. It is not mandatory to send your IFB to any vendor on the list unless a vendor requests your IFB.

Finally, we have enclosed the "Procurement Checklist for Section 18, 16(b)(2) and 406 Programs" to assist you in meeting each required step of your procurement. After completing this checklist, a copy must be submitted to this office within 30 days.

If you have any questions on the above, please contact _____ at (717) 787-7540.

Sincerely yours,

Roger L. Apple, Manager
Capital Grants Section
Bureau of Public Transit

Enclosures

C. TECHNICAL SPECIFICATIONS - ACCESSIBLE VAN (RAISED ROOF)C.1 GENERAL

Overall Seating Capacity, Dimensions and Weight

Seating capacity for vehicle configured with eight regular seats with one wheelchair position equipped with flip-up seat to be used when wheelchair passenger is not being transported. The vehicle shall be made accessible to wheelchair passengers through the use of a lift.

Gross Vehicle Weight Rating (GVWR)	8700 lb. minimum *
Wheelbase	127 inches minimum
Length of Passenger Compartment (back of driver's seat to rear door at seated shoulder height)	131 inches minimum
Width of Interior (at center seated shoulder height)	68 inches minimum
Aisle width (excluding any aisle space required between the most rearward seats)	13 inches minimum
Seat width per person (excluding any required rear full length bench seat)	18 inches minimum
Headroom at Aisle	72 inches minimum

*NOTE: The maximum empty weight (wet) of any vehicle shall not cause the GVWR or the Gross Axle Weight Rating (GAWR) to be exceeded when loaded to the maximum carrying capacity defined by any seating/wheelchair position configuration required in these specifications (150 lbs. per ambulatory passenger and 200 lbs. per wheelchair passenger).

Vehicle shall be configured with one wheelchair position as illustrated in Figure 1. The bidder is to supply diagrams of proposed interior arrangements for the seating shown in Figure 1 based upon their own vehicle interior dimensions and the requirements of this specification. Diagrams shall show location and dimensions of all seats, wheelchair restraint, modesty panels, stanchion, and other passenger assists, if these items are required by this specification. Proposed seating arrangements must be approved by the purchaser. All seats shall be forward facing unless otherwise indicated.

C.2 ENGINE

- C.2.1 Gasoline engine shall be heavy-duty truck-type with quality bearings, pistons, and crankshaft designed for sustained full-load operation. The engine displacement shall be at least 350 cubic inches.

C.2.2 Engine shall be furnished with a large capacity full flow oil filter easily reached and replaced without removal of any major component. The oil dip stick and oil fill shall be accessible from outside the vehicle in order to make them easily reached for periodic oil level checks and filling.

C.2.3 An air cleaner of the oil-bath or dry-type is required.

C.2.4 No device shall impede access through the interior engine cover, if one is provided with the vehicle.

C.3 COOLING SYSTEM

C.3.1 Radiator shall be heaviest duty available from the chassis manufacturer.

C.3.2 Radiator surge or overflow tank shall be provided (coolant recovery kit) so that coolant expelled is saved and restored to the cooling system. This item is not required if it is not available from the original chassis manufacturer.

C.3.3 The cooling system shall be equipped with an automatic pressure relief cap. The cooling system shall be designed to withstand operating pressures without leaking and be protected to prevent extreme pressure build-up.

C.3.4 Adequate access shall be provided for easy inspection and filling of the cooling system from outside the vehicle without removing any other equipment.

C.4 FUEL SYSTEM

Total fuel tank capacity shall be a minimum of 30 U.S. gallons.

C.5 EXHAUST SYSTEM

The vehicle shall be equipped with an exhaust system which meets U.S. Government noise level and exhaust emission (smoke and noxious gases) requirements.

C.6 TRANSMISSION

C.6.1 Transmission shall be fully automatic type.

C.6.2 Automatic transmission shall be equipped with an auxiliary water-oil or air-oil heat exchanger (transmission cooler) to maintain safe operating temperature at all anticipated operating conditions.

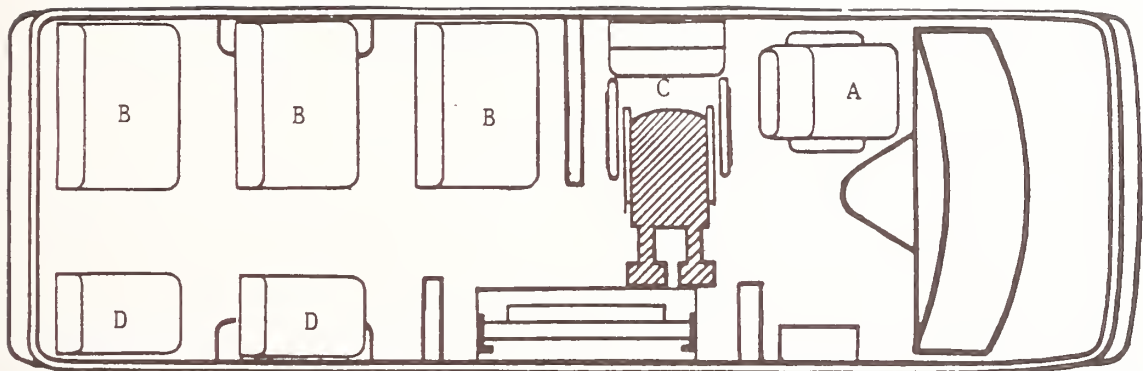
C.7 FRONT SUSPENSION

Axle capacity - 3,200 lb. minimum

Heaviest duty springs, shock absorbers, wheelbearings, hubs, and spindles available for the GVWR shall be provided.

C.8 REAR AXLE AND FINAL DRIVE

Axle capacity - 6,200 lb. minimum



SEAT	SEAT DESCRIPTION
A	Driver's Seat
B	2 Passenger Seat (Forward Facing)
C	Wheelchair/Flip Seat (Aisle Facing)
D	1 Passenger Seat (Forward Facing)

IFB SECTION	PARAGRAPH NUMBER	CHANGE/ADDITION
C (SPEC L)	C.2.1	The engine shall be heavy-duty truck-type diesel with quality bearings, pistons, and crankshaft designed for sustained full-load operation. The engine displacement shall be at least 6.2 liters.

JUSTIFICATION:

Request that vehicle be equipped with a diesel engine rather than a gasoline engine to provide for greater fuel economy.

Harrisburg, Pennsylvania 17120

IFB Number: _____

Dear _____:

This office has reviewed your _____ submission of an
Invitation for Bids (IFB) for the purchase of _____

under project number _____. Your IFB is approved subject to the
following:

You may proceed to advertise your IFB in strict compliance with the
"Mandatory Competitive Sealed Bidding Procedure for Section 1^o, 1f(b)(2), and
406 Programs" sent to you earlier. You are required to place the advertisement
within thirty days of the date of this approval letter. At the time of adver-
tisement we require that you send this office the following:

- (1) A copy of the bid advertisement
- (2) A copy of the final edition of your IFB distributed to vendors.

If you have any questions on the above, please contact _____
at (717) 787-7540.

Sincerely yours,

Roger L. Apple, Manager
Capital Grants Section
Bureau of Public Transit

FORM B.6
SMALL TRANSIT VEHICLE VENDORS
09/16/88

COMPANY -----	ADDRESS -----	CITY ----	ST ZIP -- --	CONTACT PERSON -----	PHONE -----	CODE* ----
Collins Bus Corporation	Post Office Box 2946	Hutchinson	KS 67504 -2946	Ms. Carol M. Walle	316-662-9000	
Conaway Bus Sales & Leasing	P. O. Box 1132	Uniontown	PA 15401	Mr. Dave Coughanour	412-439-8800	EF
Coons Manufacturing, Inc.	2300 W. Fourth Street, P.O. Box 489	Oswego	KS 67356	Mr. Robert Seeber	316-755-2131	
Creative Transportation Systems, Inc.	57 Traveland Lane	East Irvine	CA 92650	Mr. Rick Lake	714-857-6326	
Crow River Industries, Inc.	3200 Harbor Lane	Minneapolis	MN 55441 -2003	Mr. Brendan Healy	800-328-3632	
Deere Marketing Services, Inc.	P.O. Box 3500	Waterloo	IA 50704	Mr. Joe Alexander	319-232-7809	
Del-Val Driving Aids & Contractors	237 Fawn Hill Road	Broomall	PA 19008	Mr. Steve Visco	215-353-0714	DE
Division Transportation Systems	501 Hampton Park Blvd.	Capital Heights	MD 20743 -3082	Mr. Tim Hughes	301-499-1000	E
The Dutcher Corporation	180 Villicitos De Oro	San Marcos	CA 92069	Mr. James R. Thompson	619-744-6003	
Eastern Bus Sales & Service	1065 Belvoir Road	Norristown	PA 19401	Mr. Daniel MacFarland	215-272-6600	
Eastern Mobility Co.	#4 Council Drive	Woodsboro	MD 21798	Mr. Stephen T. Augustine	301-838-3686	
El Dorado Motor Corporation	P. O. Box 266	Minneapolis	KS 67467	Mr. Sheldon Walle	913-352-2171	
Ford Motor Company	P. O. Box 816	Pennsauken	NJ 08100	Mr. Brian Lachewitz	609-486-2000	
Goshen Coach Corporation	52684 Dexter Drive East	Elkhart	IN 46514	Mr. Robert West	219-262-0199	
Gross Equipment Co., Inc.	R.D. #1, Box 387	Bechtelsville	PA 19505	Mr. Bill Gross	215-367-2685	
Handi-Van, Inc.	8250 Eastwood Road	Minneapolis	MN 55432	Mr. James Sculthorp	612-786-5235	
Hausman Bus Sales & Parts Co.	P. O. Box 359, North Broadway	Pitman	NJ 08071	Mr. Roland E. Waller	609-589-8200	
Haveco	421 Amity Road, Box 2227	Harrisburg	PA 17111	Mr. Greg Seitz	717-238-1530	
Keller Wheelchair Lifts & Vehicle Conversions	197 Main Street	Luzerne	PA 18709	Mr. James Keller	717-288-1004	

Harrisburg, Pennsylvania 17120

Subject: _____

Dear _____:

This office has reviewed the material you submitted concerning your agency's _____ bid opening under the subject project and concurs with your selection of _____ as the lowest responsive and responsible bidder. You may award a contract to the successful bidder for the purchase of _____.

We will process a payment of \$ _____ so that it is available at the time of delivery. However, the check will not be released until you contact this office by telephone (with a written follow-up) as soon as the equipment has been delivered.

To insure prompt payment, you are obligated to provide this office a copy of the vendor's invoice and written notification of the equipment's delivery date. This must be sent at least three weeks prior to the delivery date to allow for processing time. In order to meet your obligation, we suggest that you request the vendor's invoice and written notification of delivery from the successful bidder. We have prepared the attached sample letter (Exhibit "A") and form (Exhibit "B") for your use.

Enclosed are four copies of an amendment to the contract between the Commonwealth and your agency increasing the total project cost to \$ _____. Please have these contracts executed by having the organization's president or vice president sign the contractor portion of the second page of each copy and the secretary or treasurer attest on the left. Affix the seal of the corporation over the attestation signature. Return all copies to this office. A fully executed copy of the agreement will be forwarded to you at a later date.

In addition, the enclosed New Vehicle Operation Inspection Checklist must be completed and transmitted to this office. Failure to submit this checklist will result in the withdrawal of payment. Also, assure that the checklist is completed according to the attached instructions. Any checklist submitted which is improperly completed will be returned for corrections. Please note that, unless the vehicle can be titled to your agency upon delivery, Part VI (Road Test) of the checklist must be performed immediately upon delivery. We suggest that you contact the vendor in advance of delivery to make these arrangements.

If you have any questions, please call _____ of my staff at (717) 787-7540.

Sincerely yours,

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Scott Casper, Director
Bureau of Public Transit.

Enclosures

FORM B.8

(ADDRESS OF BIDDER)

DEAR EQUIPMENT/VEHICLE MANUFACTURER:

The Pennsylvania Department of Transportation (DEPARTMENT) requires written notification of the anticipated delivery date and the vendor's invoice for the (DESCRIPTION of EQUIPMENT/VEHICLE(s)) to be provided to our organization under our contract dated (DATE OF CONTRACT). Please complete the attached forms and send to the address indicated on each along with the vendor's invoice at least three to four weeks prior to delivery when the delivery date can be accurately predicted.

If the Department does not receive the attached notification of delivery and vendor's invoice at least three weeks before the actual delivery date, payment will not be possible within the 10 day period outlined in Section B.3 of the Invitation for Bids.

Your cooperation in providing this information will help assure a timely payment. If there are any questions, please contact us.

(AGENCY/COUNTY SIGNATURE)

Exhibit "A"

NOTIFICATION OF DELIVERY

- A. IFB Number: _____
- B. Name and Address of Vendor: _____

- C. Equipment/Vehicles to be Delivered: _____

- D. Bid Price: _____
- E. Delivery Date: _____
- F. Signature: _____ (Name)
_____ (Title)
_____ (Date)

Please mail original of this form to:

Director
Bureau of Public Transit
1215 Transportation & Safety Building
Harrisburg, Pennsylvania 17120

Also send a copy to:

(Agency/County - Name & Address)

Exhibit "B"

NEW VEHICLE OPERATION

INSPECTION CHECKLIST

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

BUREAU OF PUBLIC TRANSIT

PROJECT NUMBER _____

VEHICLE TYPE _____

ACTUAL VEHICLE DELIVERY DATE _____

AGENCY NAME _____

INSTRUCTIONS: To complete the New Vehicle Operation Inspection Checklist for each vehicle delivered:

1) Enter the project number, vehicle type, actual vehicle delivery date and agency name on the above spaces.

2) Place the appropriate numbers or information from Section C of the Invitation for Bids (IFB) package in the "Requirement" column of Part II of the checklist. The information for the "Requirement" column in Part II of the checklist is located in Section C of the IFB package.

3) When the vehicle is delivered, complete Part I through Part VII of the checklist. Follow the inspection instructions for each item listed. For each item which passes inspection, place a check mark in the "Pass" column. For each item which is defective during inspection, place a check mark in the "Defective" column and enter any comments in the "Comments" column. Contact the vendor and arrange for correction of all defective items. Once each defective item is corrected, place a check mark in the "Corrected" column of the checklist and enter the date it was corrected in the "Date" column.

4) When all defective items are corrected and the vehicle is determined to be in acceptable condition, the inspector's signature, the date of inspection, and the vehicle identification number must be furnished on the last page of the checklist.

5) A copy of the completed checklist should be mailed to the address shown on the last page of the checklist.

VEHICLE OPERATION INSPECTION - Part 1: Delivery Inspection

ITEM	SECTION OF SPEC'S	INSPECTION INSTRUCTIONS	PASS	DEFECTIVE	COMMENTS	CORRECTED	DATE
Federal Motor Vehicle Safety Standards (FMVSS)	A.2.6	Verify that the vehicle does comply with all applicable Federal Motor Vehicle Safety Standards (FMVSS) by checking the affixed safety certification label (driver's side door pillar).					
Warranty Verification Vouchers, Coupons or Certificates	A.8.1	Verify that all warranty verification vouchers, certificates or coupons were furnished.					
Pennsylvania Official Inspection Sticker	A.8.2	Verify that a current Pennsylvania official inspection sticker is affixed on the vehicle.					
Operator's Manual	A.8.3	Verify that an operator's manual is provided for the vehicle and all add-on equipment.					
Drawings showing wiring schematics	A.8.4	Verify that drawings showing wiring schematics of auxiliary circuits are provided.					
Completely filled fuel tank(s)	A.8.5	Check that the fuel tank or tanks are completely filled.					
Dealer signs and emblems	A.8.7	Verify that the vehicle is free of dealer signs and emblems.					
Assurance of compliance with manufacturer's pre-delivery service	A.8.8	Verify that an assurance of compliance with the manufacturer's pre-delivery service is provided.					
Maintenance and Inspection Schedules	A.8.10	Verify that maintenance and inspection schedules are provided.					
Forms to apply for Pennsylvania vehicle title and license	B.3.5	Verify that the proper forms to apply for Pennsylvania vehicle title and license are provided.					

MANDATORY COMPETITIVE SEALED BIDDING PROCEDURE

BUREAU OF PUBLIC TRANSIT

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

The following procedures are mandated by the Pennsylvania Department of Transportation for use by all Section 18, 16(b)(2), 406 and Act 49 funding recipients (hereinafter called "procuring agencies") when requesting bids on any vehicles, materials or construction services costing over \$4,000*. Items and services costing under \$4,000* must be obtained through written quotes. The procedures to be followed in requesting quotes appear under items 14 and 15. In addition to the procedures stated below, funding recipients must comply with any requirements imposed by the laws under which they are created or by other local authorities. All correspondence regarding procedures shall be addressed to:

Scott Casper, Director
Bureau of Public Transit
1215 Transportation & Safety Building
Harrisburg, Pennsylvania 17120
Attention: Capital Grants Section

1. Prior to advertising for bids, procuring agencies will develop and submit to PaDOT for review and approval, except as indicated in item 2 below, an invitation for bids (IFB) which will contain the following information:
 - (a) Name and address of procuring agency.
 - (b) Date of issuance.
 - (c) Date, time and location of bid opening.
 - (d) A description of the supplies or services to be procured.

*\$10,000 if 16(b)(2) funded.

PROCUREMENT CHECKLIST FOR
SECTION 18, 16(b)(2) and 406 PROGRAMS

This checklist summarizes the PA DOT procurement procedures detailed in the "Mandatory Competitive Sealed Bidding Procedure", hereinafter referred to as "Bidding Procedure". The items marked with a "X" apply only to vehicle procurements. Please check each item as it is accomplished:

- X ☐ DETERMINE TYPE OF VEHICLE (REFER TO SMALL TRANSIT VEHICLE LISTING).
- X ☐ REQUEST SPECIFICATION PACKAGE FROM PA DOT.
- ☐ DEVELOP INVITATION FOR BIDS (IFB) (SEE ITEMS 1, 2 AND 3 OF BIDDING PROCEDURE).
- ☐ SUBMIT COMPLETE IFB TO PA DOT FOR APPROVAL.
- ☐ RECEIVE PA DOT APPROVAL OF IFB.
- ☐ SCHEDULE A PRE-BID CONFERENCE (IF NECESSARY).
- ☐ ADVERTISE FOR BIDS AT LEAST 45 DAYS BEFORE BID OPENING. (SEE ITEM 4 OF BIDDING PROCEDURE).
- ☐ SEND THE IFB TO AT LEAST THREE VENDORS.
- ☐ SEND THE IFB TO ALL VENDORS WHO REQUEST IT.
- ☐ RECEIVE REQUESTS FOR CLARIFICATIONS, EXCEPTIONS AND/OR APPROVED EQUALS FROM VENDORS NO LESS THAN 30 DAYS PRIOR TO BID OPENING AND DETERMINE IF REQUESTS ARE ACCEPTABLE.
- ☐ CONDUCT A PRE-BID CONFERENCE (IF NECESSARY).
- ☐ RECEIVE PA DOT APPROVAL OF CHANGES AND/OR ADDENDA WHICH WILL BE MADE TO THE IFB.
- ☐ SEND ALL CHANGES AND/OR ADDENDA TO ALL BIDDERS AT LEAST 15 DAYS BEFORE BID OPENING.
- ☐ ASSURE THAT THERE ARE NO UNANSWERED PROTESTS PRIOR TO BID OPENING.
- ☐ CONDUCT A PUBLIC BID OPENING AND IDENTIFY THE APPARENT LOW BIDDER.
- ☐ EVALUATE THE APPARENT LOW BID TO DETERMINE IF THE BID MEETS THE SPECIFICATIONS.
- ☐ DETERMINE THAT THE LOWEST RESPONSIVE BIDDER IS ALSO A RESPONSIBLE BIDDER. PERFORM A PRE-AWARD INSPECTION IF NECESSARY. (SEE SECTION B.1 OF IFB).
- ☐ SEND SUMMARY OF ALL BIDS TO PA DOT. PROVIDE JUSTIFICATION IF PROPOSING AWARD TO OTHER THAN LOW BIDDER OR IF ONLY ONE BID WAS RECEIVED. (SEE ITEMS 9, 10 and 11 OF BIDDING PROCEDURE).
- ☐ RECEIVE PA DOT CONCURRENCE WITH SELECTION OF LOWEST RESPONSIVE AND RESPONSIBLE BIDDER.
- ☐ AWARD A CONTRACT TO THE LOWEST RESPONSIVE AND RESPONSIBLE BIDDER.
- ☐ PERFORM ON-LINE INSPECTION OF VEHICLE DURING CONSTRUCTION IF NECESSARY. (SEE SECTION B.1 OF IFB). FOR OTHER PROCUREMENTS, INSPECT UPON DELIVERY/INSTALLATION.
- ☐ SEND PA DOT A REQUISITION FORM INCLUDING VENDOR INVOICE. FOR VEHICLE PURCHASES THE REQUISITION SHOULD BE FORWARDED TO PA DOT 21 DAYS BEFORE DELIVERY.
- X ☐ NOTIFY PA DOT IMMEDIATELY THAT THE VEHICLE HAS BEEN DELIVERED.
- X ☐ PERFORM INSPECTION USING PA DOT NEW VEHICLE OPERATION INSPECTION CHECKLIST.
- ☐ RECEIVE PAYMENT FROM PA DOT.
- X ☐ SEND PA DOT A COMPLETED NEW VEHICLE OPERATION INSPECTION CHECKLIST FOR EACH VEHICLE.
- ☐ MAKE PAYMENT TO VENDOR. FOR VEHICLES REFER TO SECTIONS B.2 AND B.3 OF IFB.
- ☐ HANDLE ANY PROTESTS OR DISPUTES. SEE ATTACHMENT "A" AND "B" IN BIDDING PROCEDURE.

AGENCY NAME: _____
 COMPLETED BY: _____
 PROJECT NUMBER: _____
 DESCRIPTION OF ITEM(S) PROCURED: _____
 DATE OF BID OPENING: _____

WITHIN 30 DAYS OF COMPLETION, SEND A COPY OF CHECKLIST TO:

Mr. Robert Zolyak, Project Engineer
 Pennsylvania Department of Transportation
 Bureau of Public Transit & Goods Movement Systems
 1215 Transportation and Safety Building
 Harrisburg, Pennsylvania 17120

APPENDIX C

LIFE CYCLE COST EVALUATION

PennDOT small transit vehicle bidding procedures generally rely on the low bid method of selecting a vehicle vendor. The IFB contract is awarded to the "lowest responsive and responsible bidder." An alternative to the low bid process is the life cycle cost evaluation method. This method uses the life cycle cost of the vehicle, rather than the initial purchase cost, as the determining factor in bid selection. Life cycle costs include acquisition, operating and maintenance costs; in other words, all the costs associated with a vehicle during its useful life. The life cycle cost method utilizes a variety of criteria in the evaluation of bids, including a vehicle's durability, or useful life expectancy, maintenance requirements, fuel economy and capital cost.

While this option may appear useful, some transit operators consider it impractical. Many factors used in the life cycle cost evaluation are approximations, lacking hard data. Projected costs may be difficult to document, and disputes concerning these figures may not be easy to resolve. In addition, data on vehicle performance may be difficult to verify, since much depends on an agency's individual vehicle

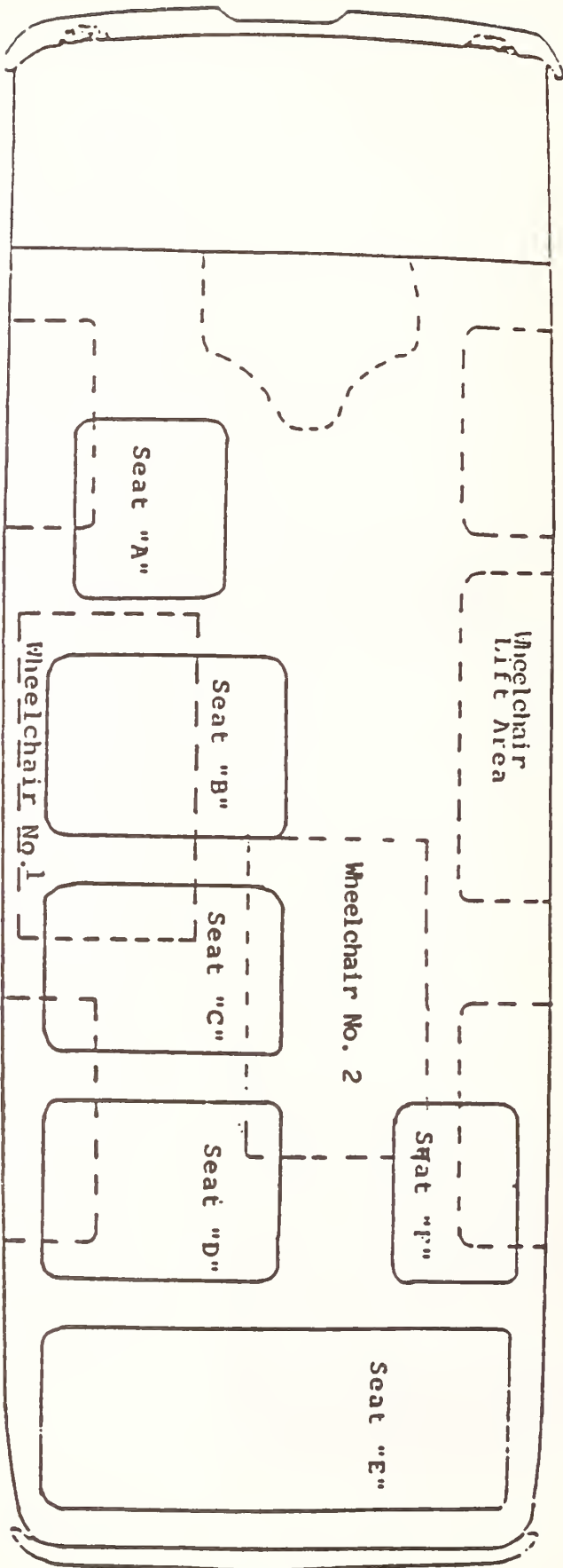
care (i.e. extent of use, type of service route, quality of preventive maintenance, etc.) Also, budget constraints may not permit the procurement of a vehicle which has a high initial cost, even though it may be less expensive to operate in the long run. It is not possible to be sure, even with careful evaluation, that the life cycle cost approach produces the most reliable vehicle, and numerous changes in small transit vehicles from year to year make it especially difficult to obtain verifiable data. Although it is available as an option, for these reasons the life cycle cost method is not commonly used.



APPENDIX D

ALTERNATIVE SEATING DIAGRAMS

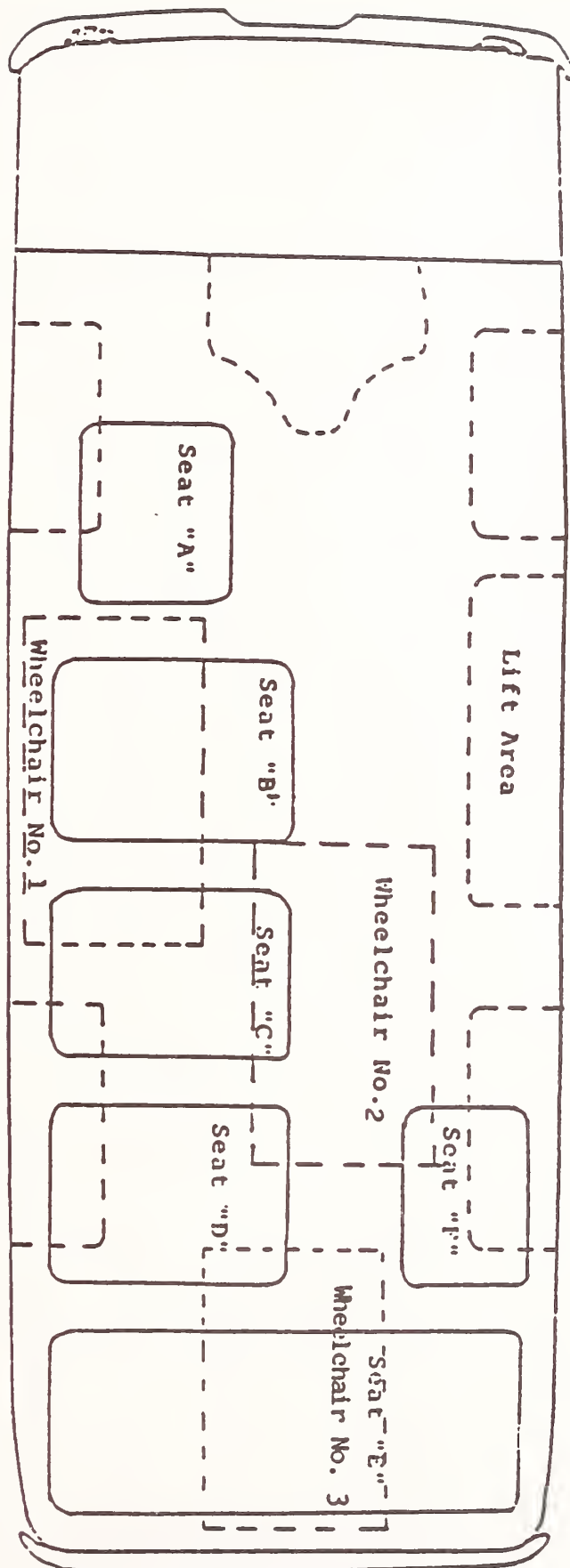
Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



NOTES:

- Seat "A" - Driver's seat
- Seat "B", "C", and "D" - two-passenger bench seat
- Seat "E" - four-passenger bench seat
- Seat "F" - single-passenger removable seat
- Seats "B", "C", and "D" shall be removable seats
- Seat "E" shall be a removable seat
- There shall be an aisle between seats "D" and "F"
- Wheelchairs No. 1 and 2 shall be forward facing

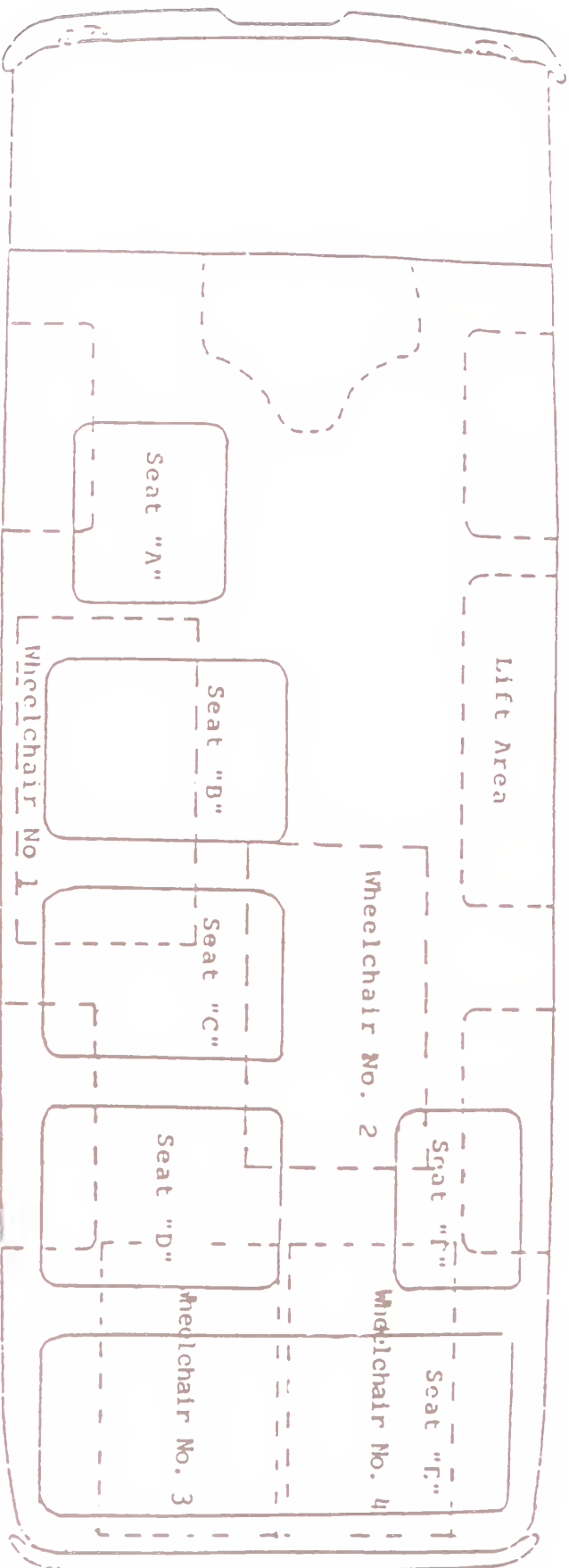
Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



NOTES:

- Seat "A" - Driver's seat
- Seat "B", "C", and "D" - two-passenger bench seat
- Seat "E" - four-passenger bench seat
- Seat "F" - single-passenger removable seat
- Seats "B", "C", and "D" shall be removable seats
- Seat "E" shall be a removable seat
- There shall be an aisle between seats "D" and "F"
- Wheelchairs No. 1, 2 and 3 shall be forward facing

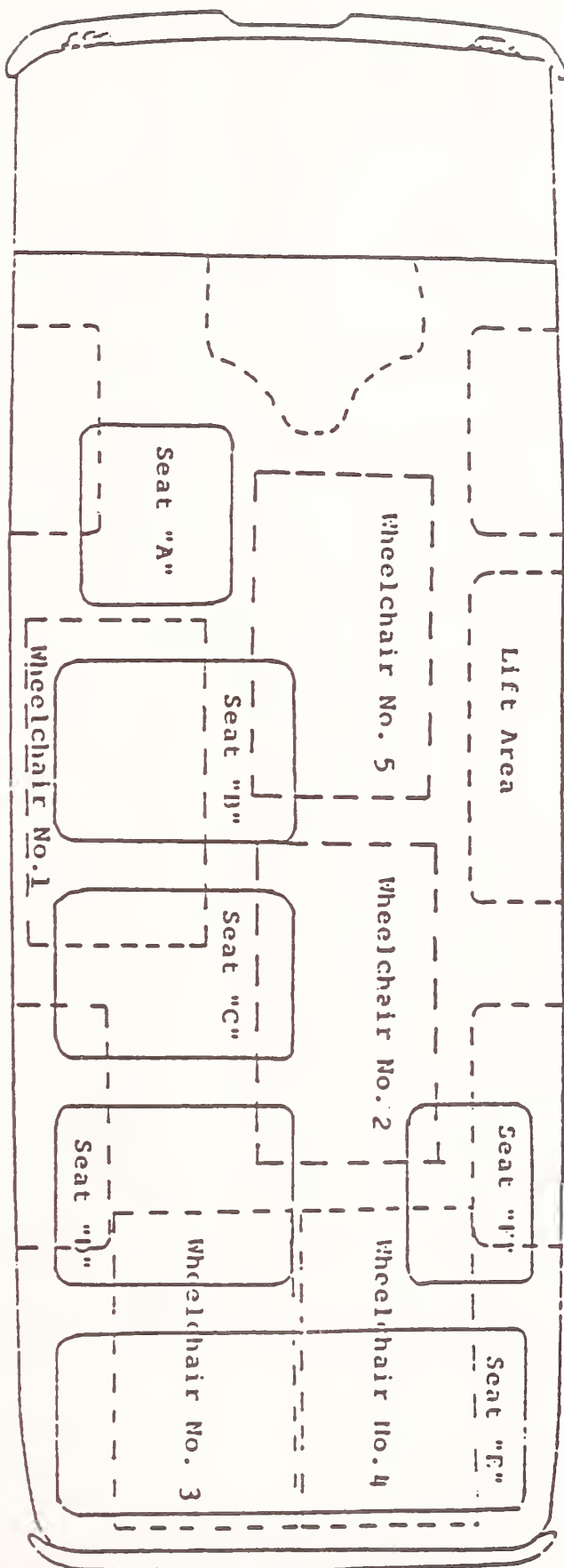
Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



NOTES:

- Seat "A" - Driver's seat
- Seat "B", "C", and "D" - two-passenger bench seat
- Seat "E" - four-passenger bench seat
- Seat "F" - single-passenger removable seat
- Seats "B", "C", and "D" shall be removable seats
- Seat "E" shall be a removable seat
- There shall be an aisle between seats "D" and "E"
- Wheelchairs No. 1, 2 and 3 shall be forward facing
- Wheelchair No. 4 shall be forward facing

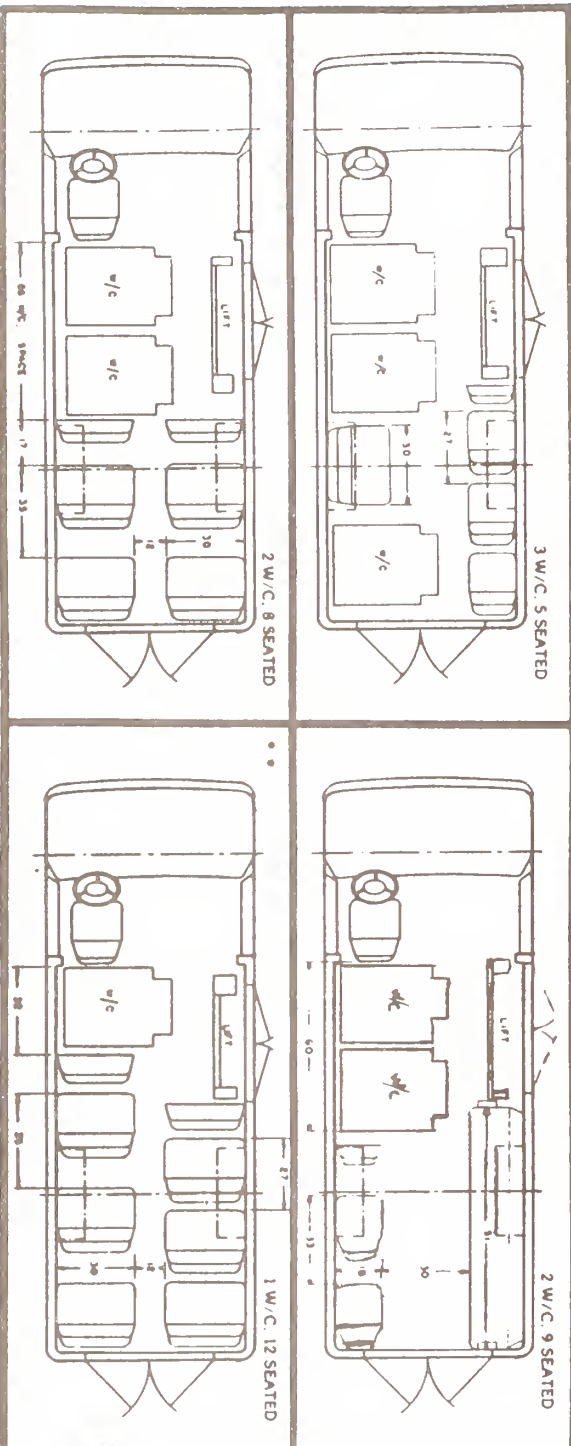
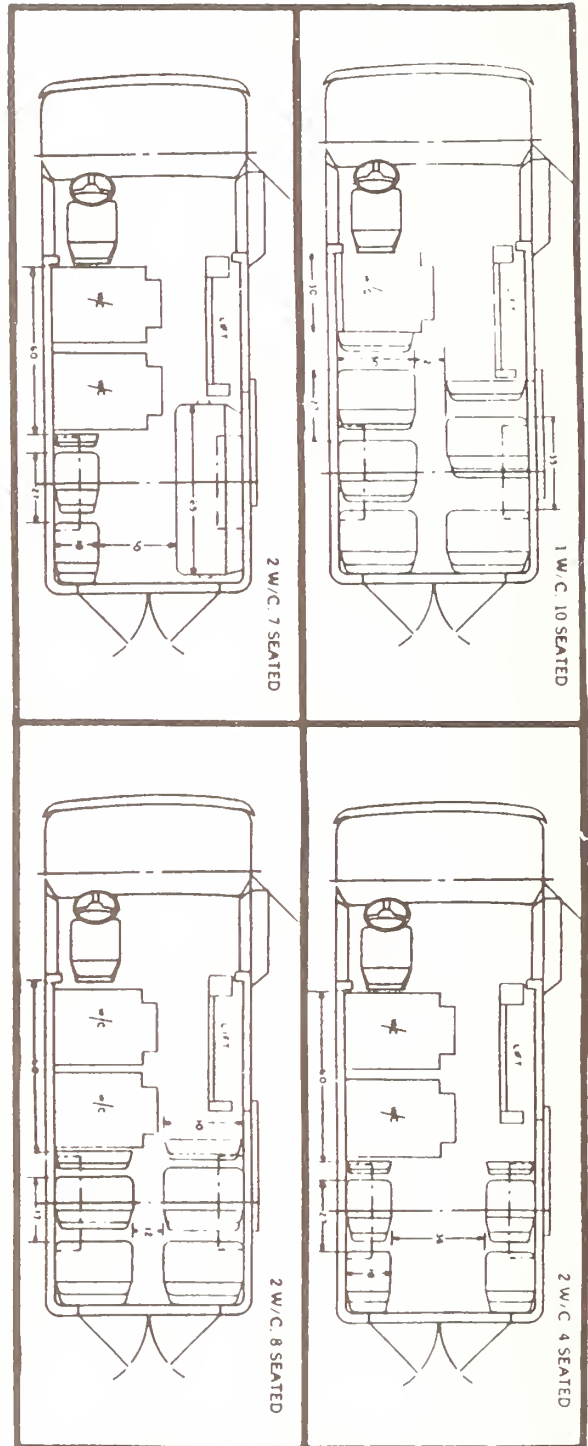
Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



NOTES:

- Seat "A" - Driver's seat
- Seat "B", "C", and "D" - two-passenger bench seat
- Seat "E" - four-passenger removable seat
- Seat "F" - single-passenger removable seat
- Seats "B", "C", and "D" shall be removable seats
- Seat "E" shall be a removable seat
- There shall be an aisle between seats "D" and "F"
- Wheelchairs No. 1, 2 and 3 shall be forward facing
- Wheelchair No. 4 shall be forward facing
- Wheelchair No. 5 shall be forward facing

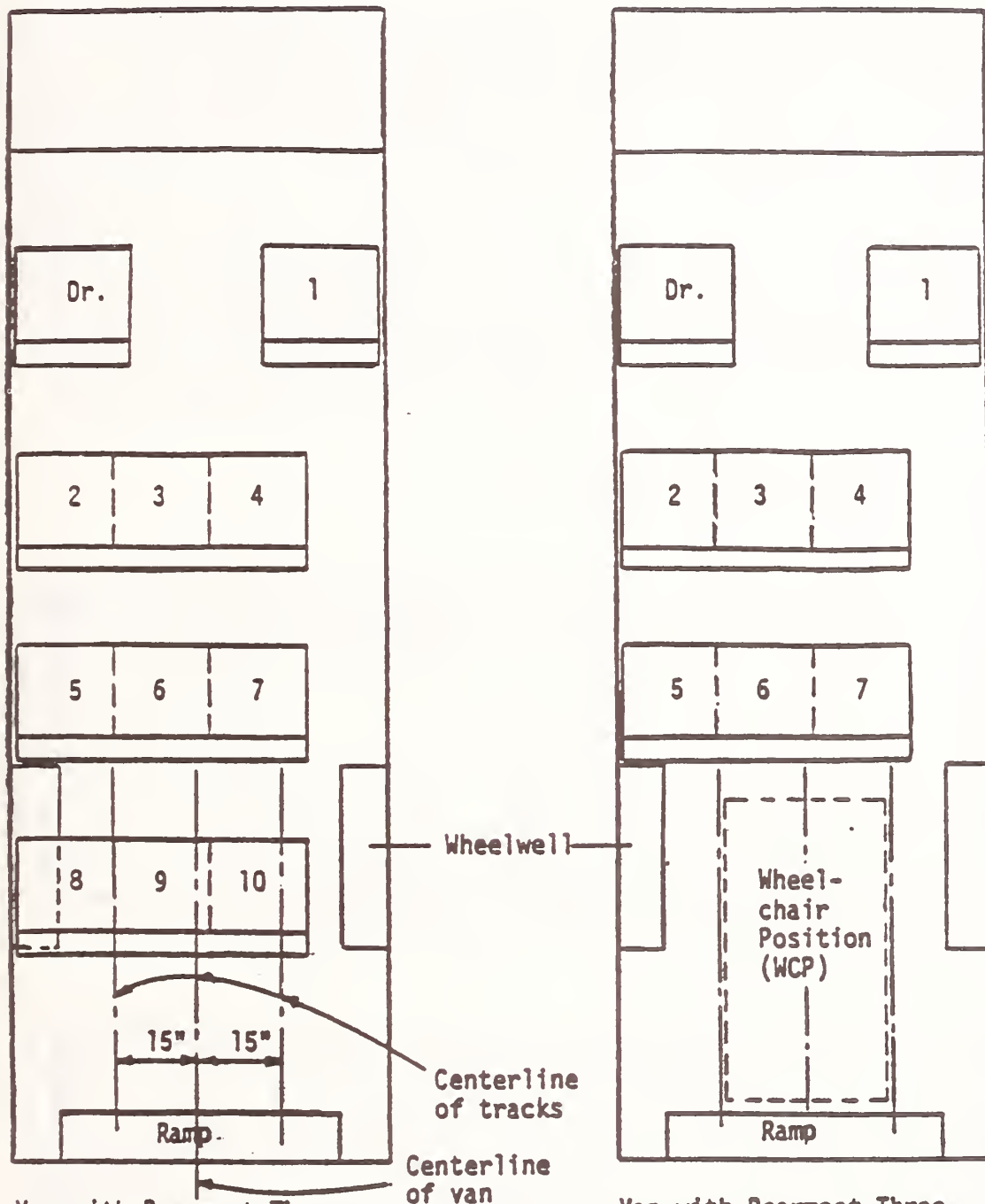
Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



• NOTE: REQUIRES FRONT MOUNTED LIFT PUMP & SQUARED W/H SEAT

• • NOTE: REQUIRES FRONT MOUNTED LIFT PUMP

Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



Van with Rearmost Three-Passenger Bench Seat in Place

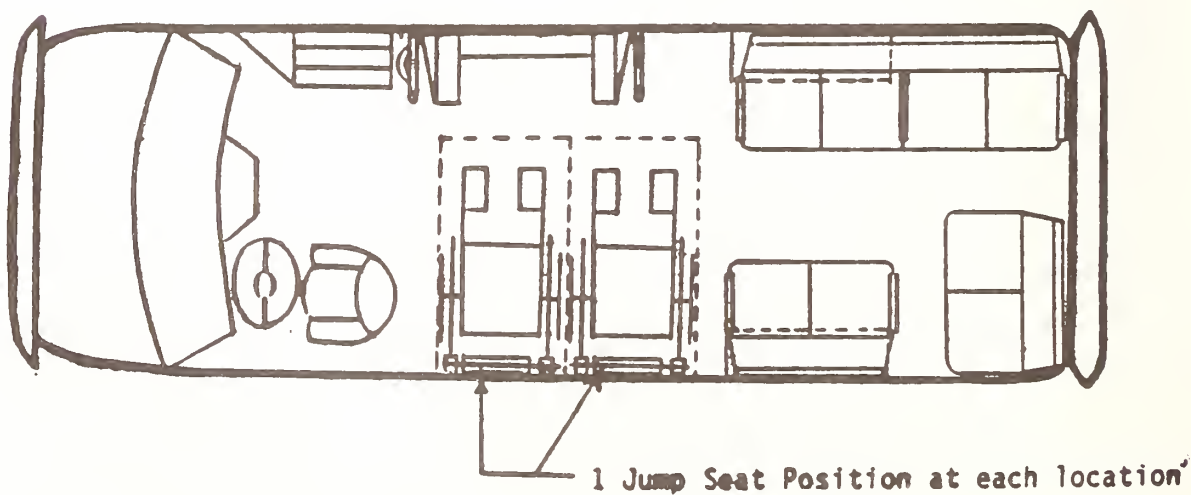
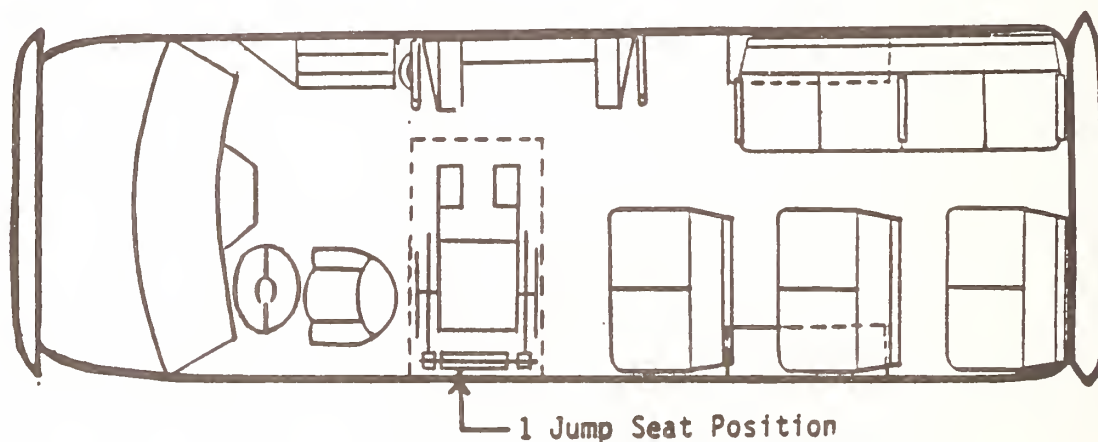
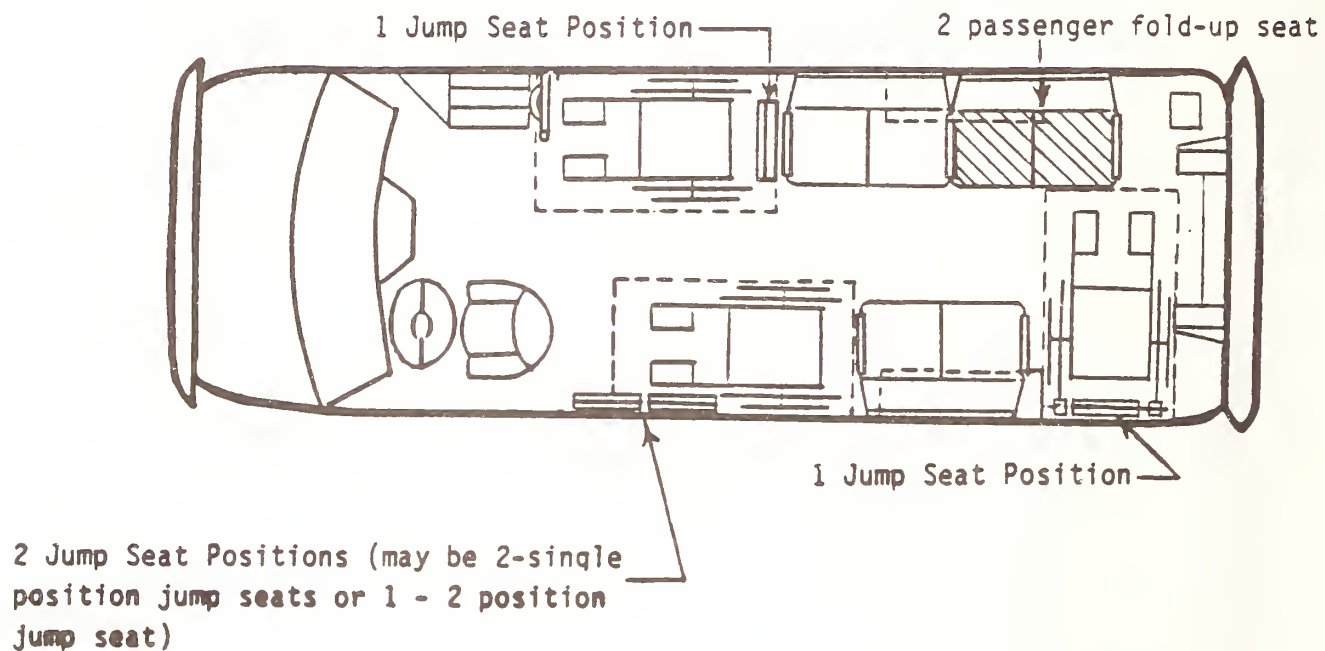
Seats: 1 Driver, 10 passengers, no wheelchairs

Van with Rearmost Three-Passenger Bench Seat Removed for One WCP

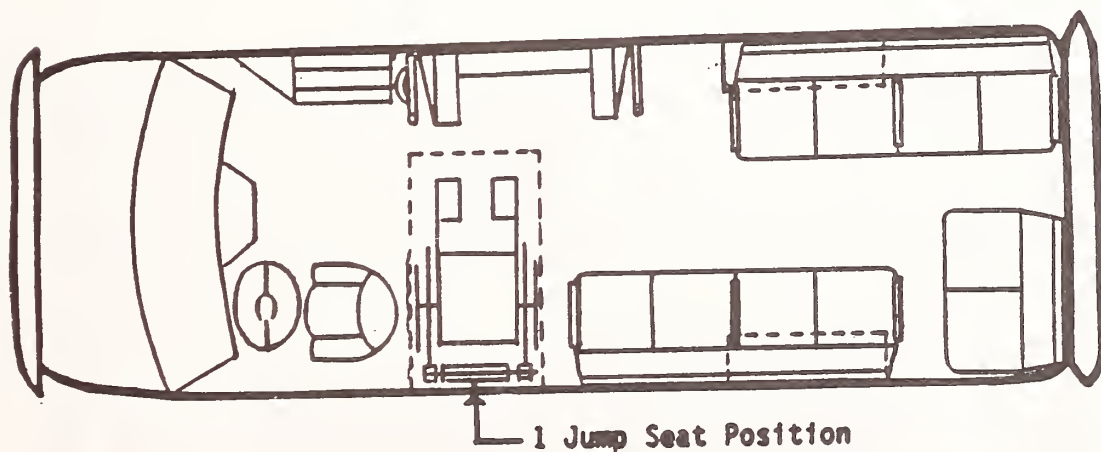
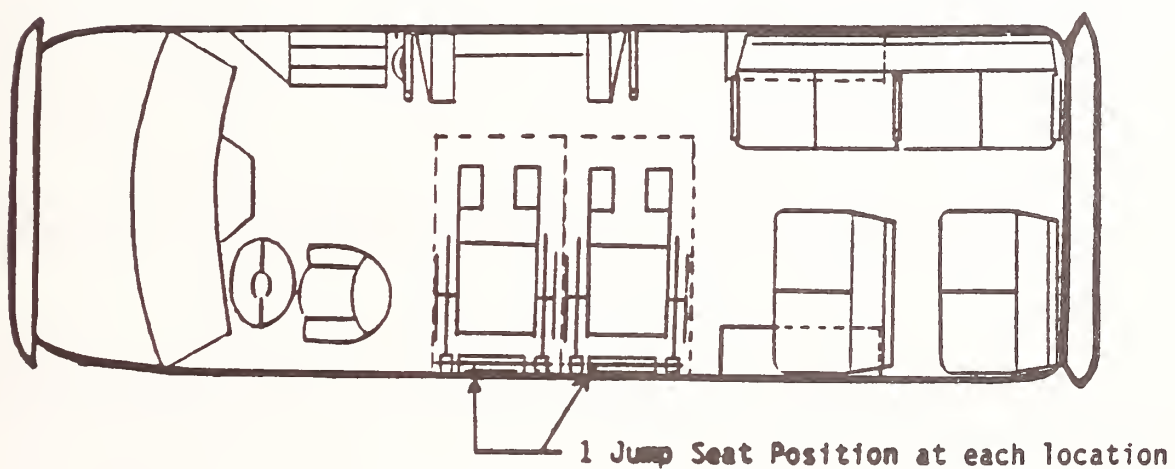
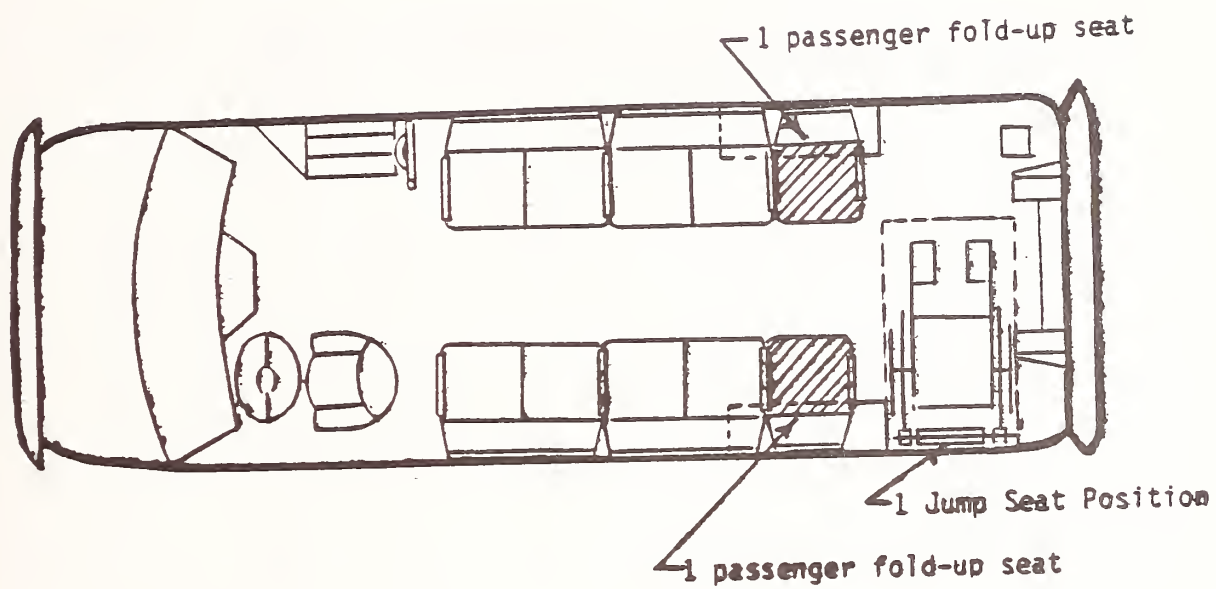
Seats: 1 Driver, 7 passengers, 1 wheelchair passenger

Note: Drawings show relative location of seats, wheelwell cover, lift and wheelchair position. Do not scale dimensions.

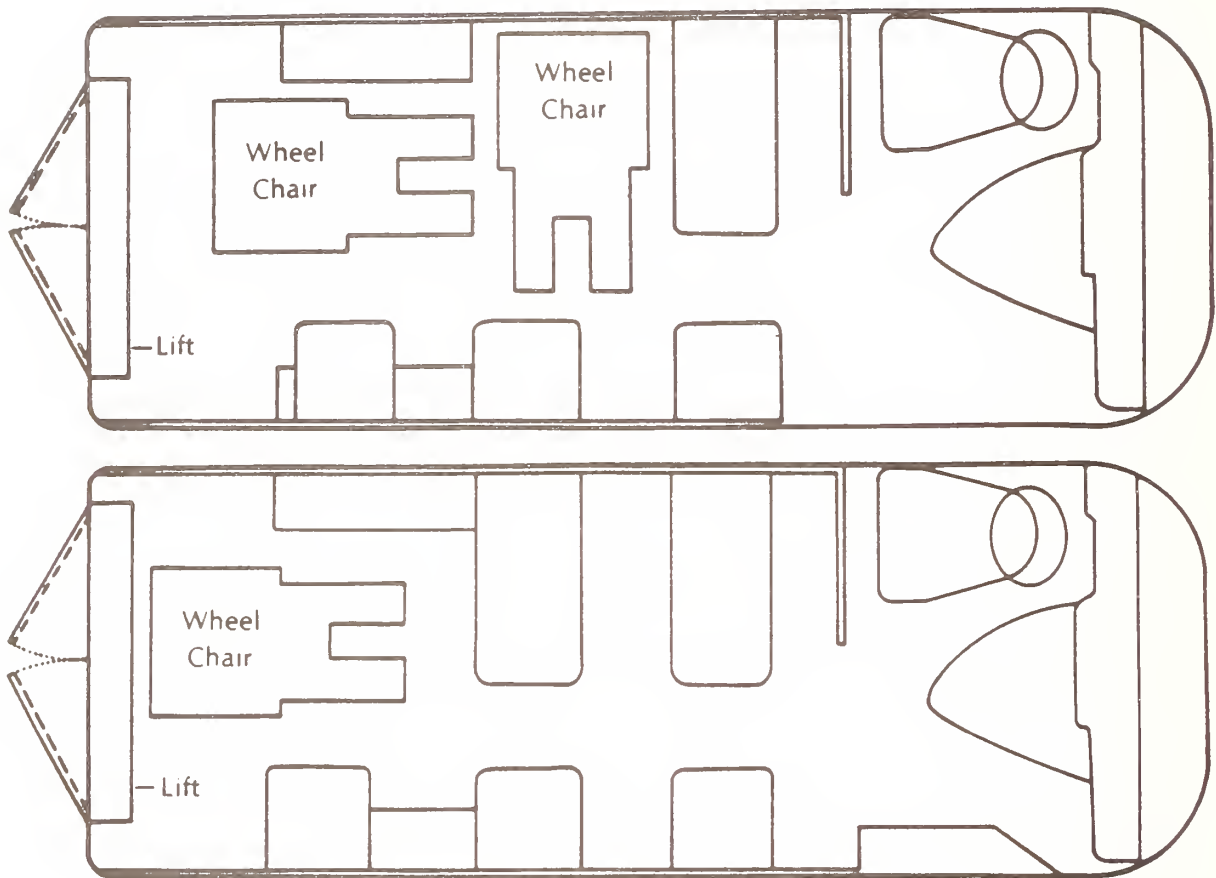
Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



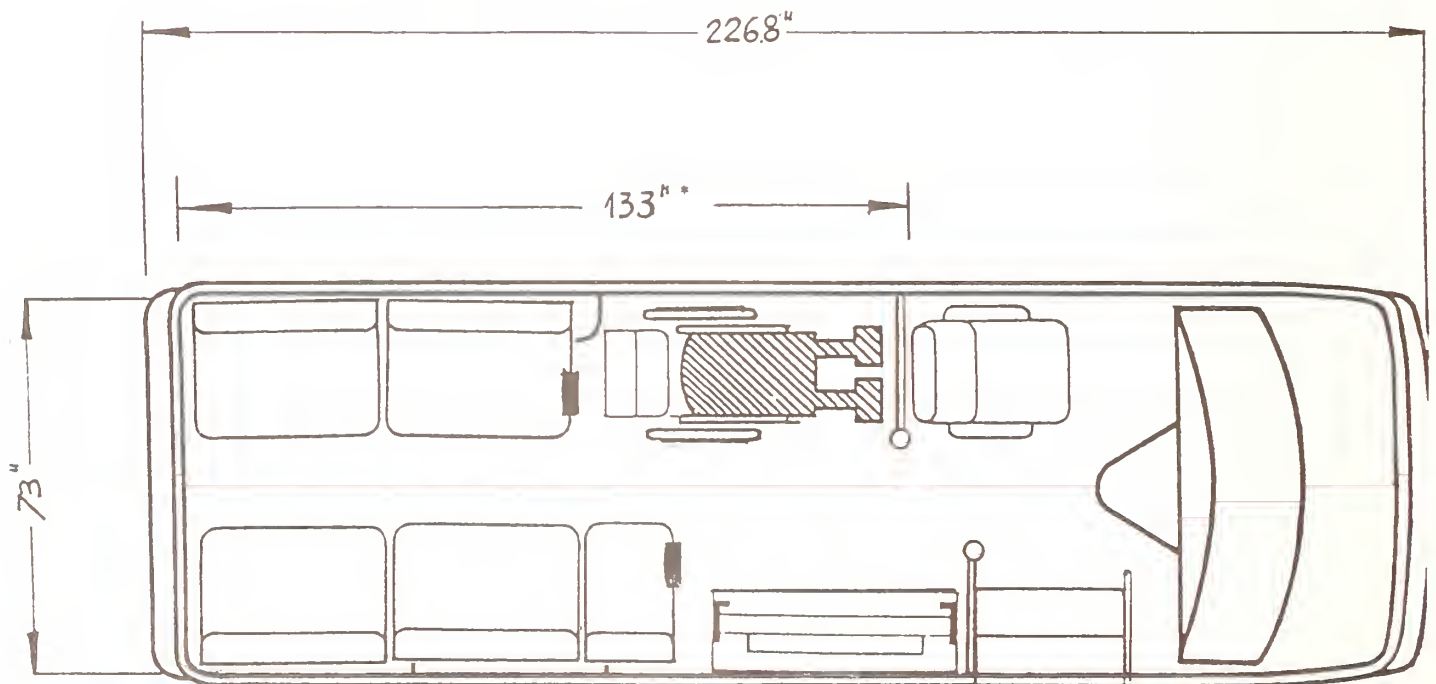
Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)



Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)

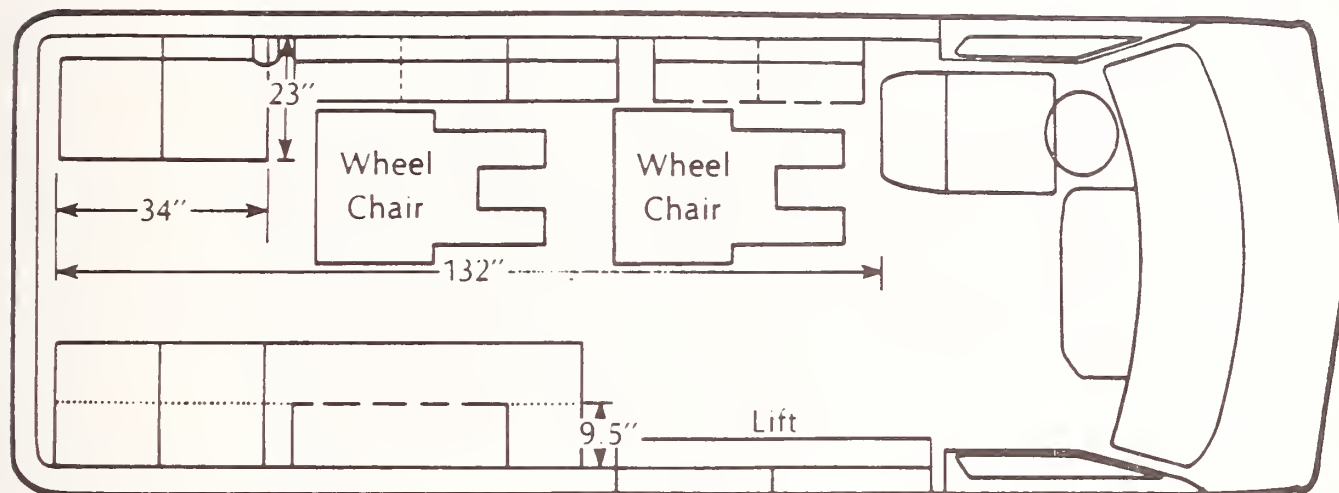


9 PASSENGER PLUS 1 WHEELCHAIR AND DRIVER

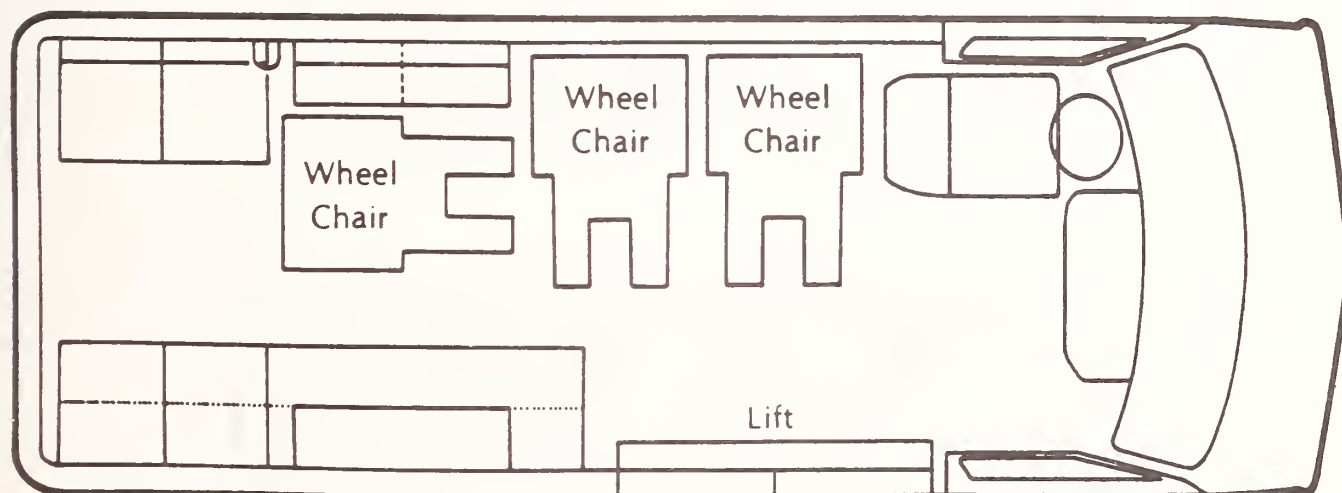


Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)

TYPICAL MODIFIED VAN WITH PERIMETER "FLIP-TYPE" SEATING.

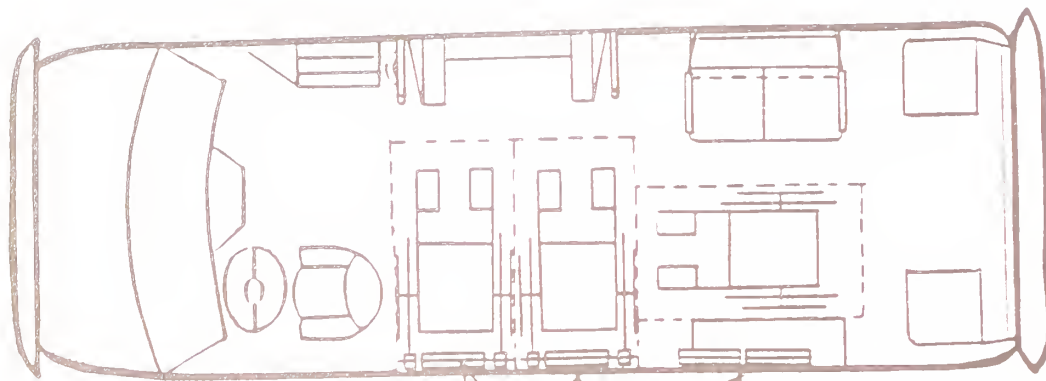


TWO WHEELCHAIR POSITIONS



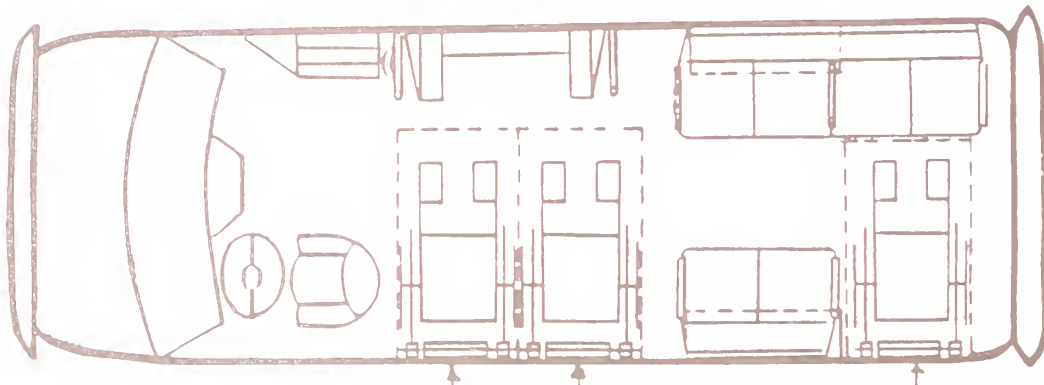
THREE WHEELCHAIR POSITIONS

comparable to PennDOT Spec 2/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)

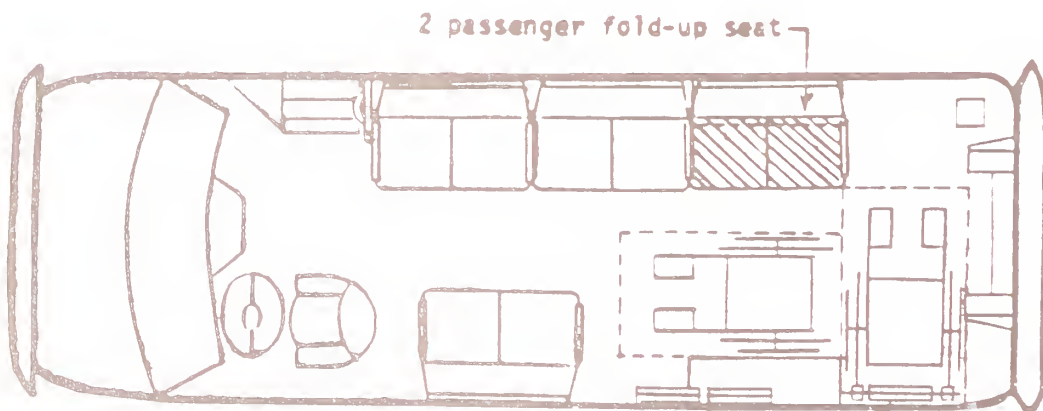


1 Jump Seat Position
at each location

2 Jump Seat Positions
(may be 2-single position
jump seats or 1 - 2
position jump seat)



1 Jump Seat Position at each location

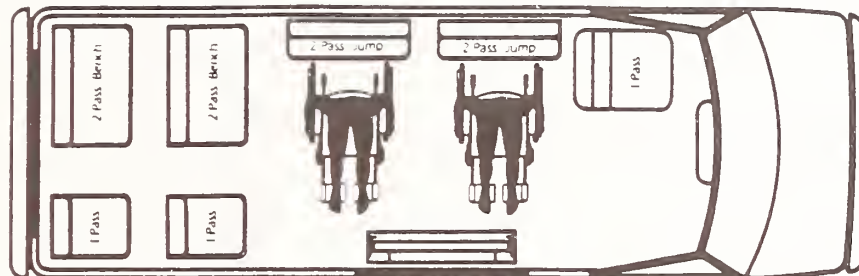


2 Jump Seat Positions (may be 2-single
position jump seats or 1 - 2 position
jump seat)

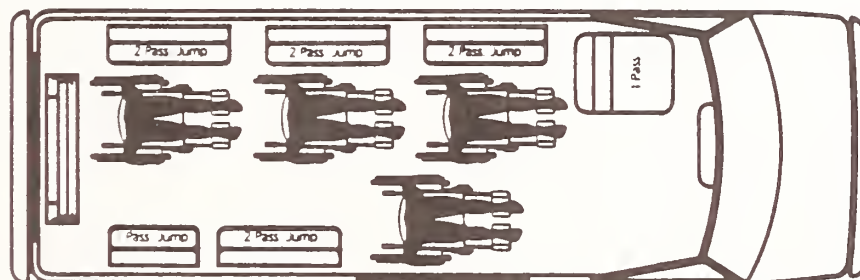
1 Jump Seat Position

Comparable to PennDOT Spec A/B or A/C - Accessible Nine (9) Passenger Van
(with or without raised roof)

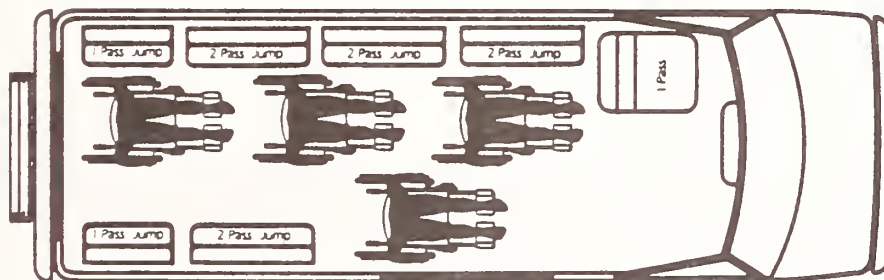
These floor plans are suggested layouts that have proven effective in transit applications. Please note that these floor plans provide an emergency exit for passengers. Many other floor plans may be obtained by combining bench seats, folding jump seats and wheelchair positions in various arrangements.



This floor plan has a side-mount wheelchair lift and will accommodate eleven (11) ambulatory passengers, or two (2) wheelchair passengers and seven (7) ambulatory passengers.

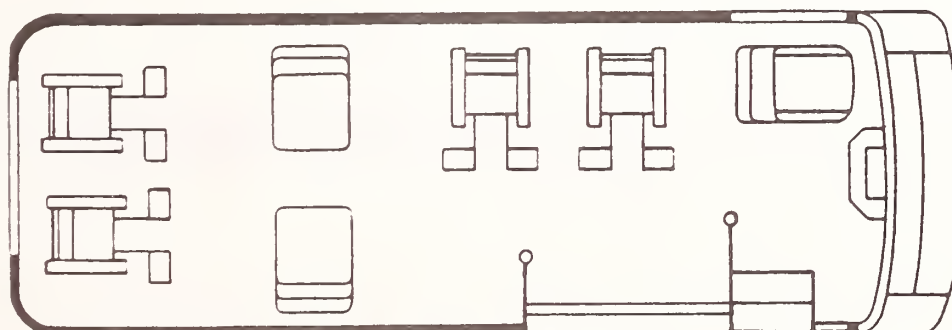


This floor plan has a rear-mount wheelchair lift and will accommodate ten (10) ambulatory passengers, or four (4) wheelchair passengers and one (1) ambulatory passenger.



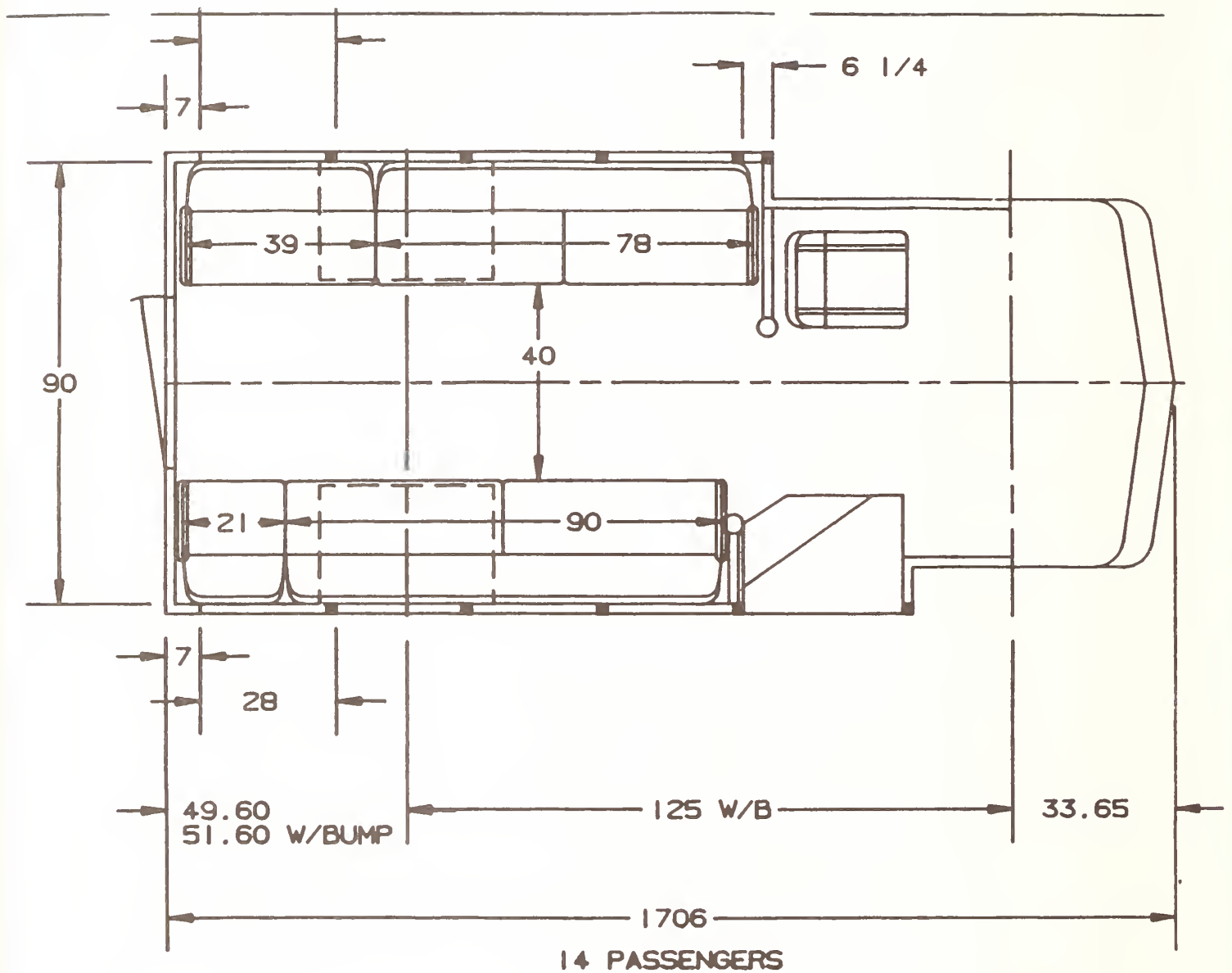
This floor plan has a rear-mount exterior wheelchair lift and will accommodate eleven (11) ambulatory passengers, or four (4) wheelchair passengers and one (1) ambulatory passenger.

Note: Seating capacities include the driver

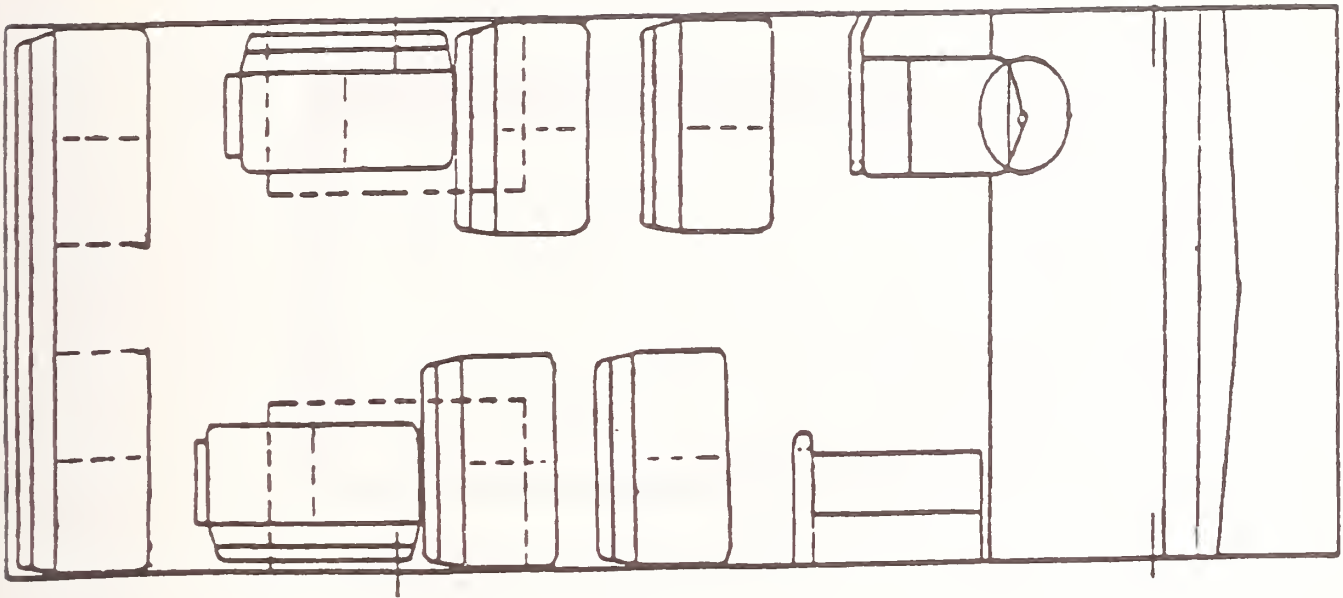


4 Wheelchair Plus 2 Passenger (Jumpseats)

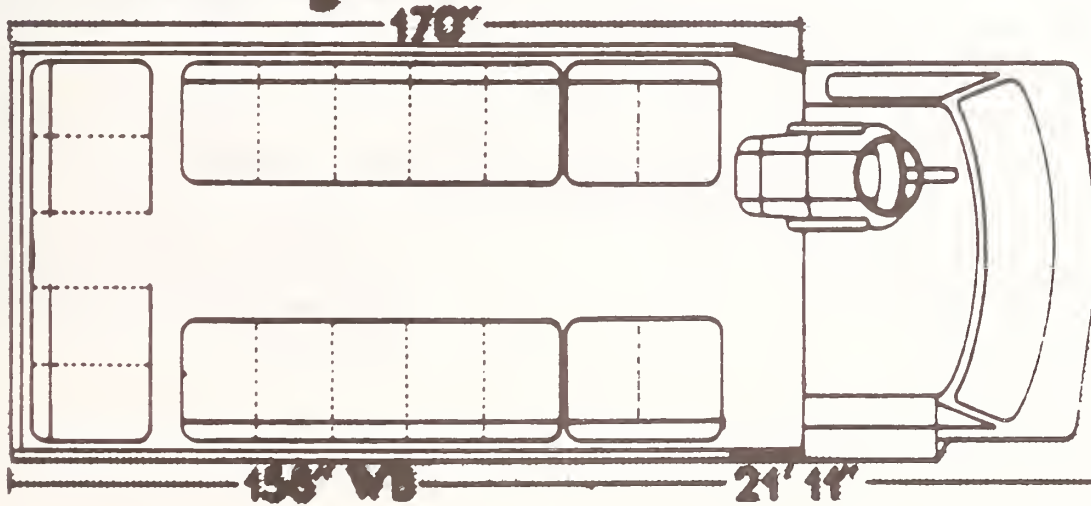
Comparable to PennDOT Spec J -
Sixteen (16) Passenger Small Transit Bus



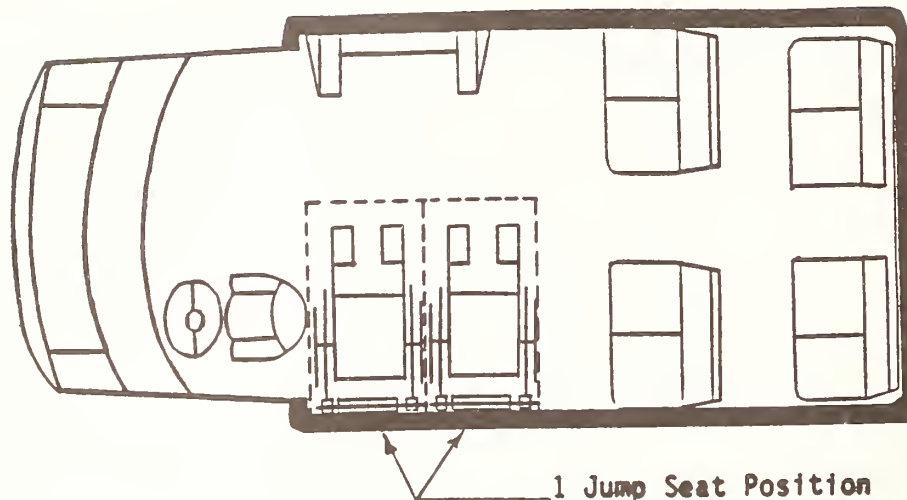
16 Passengers, no lift



18 - Passenger

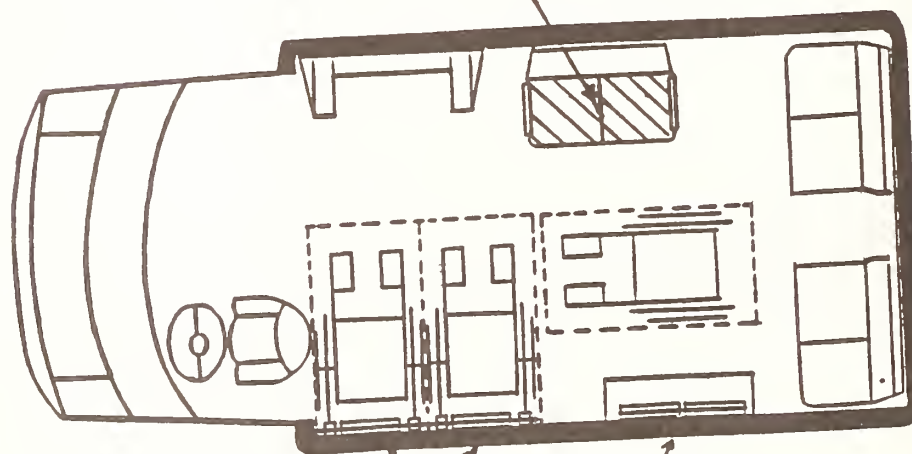


Comparable to PennDOT Spec A/J - Accessible
Eleven (11) Passenger Small Transit Bus



1 Jump Seat Position
at each location

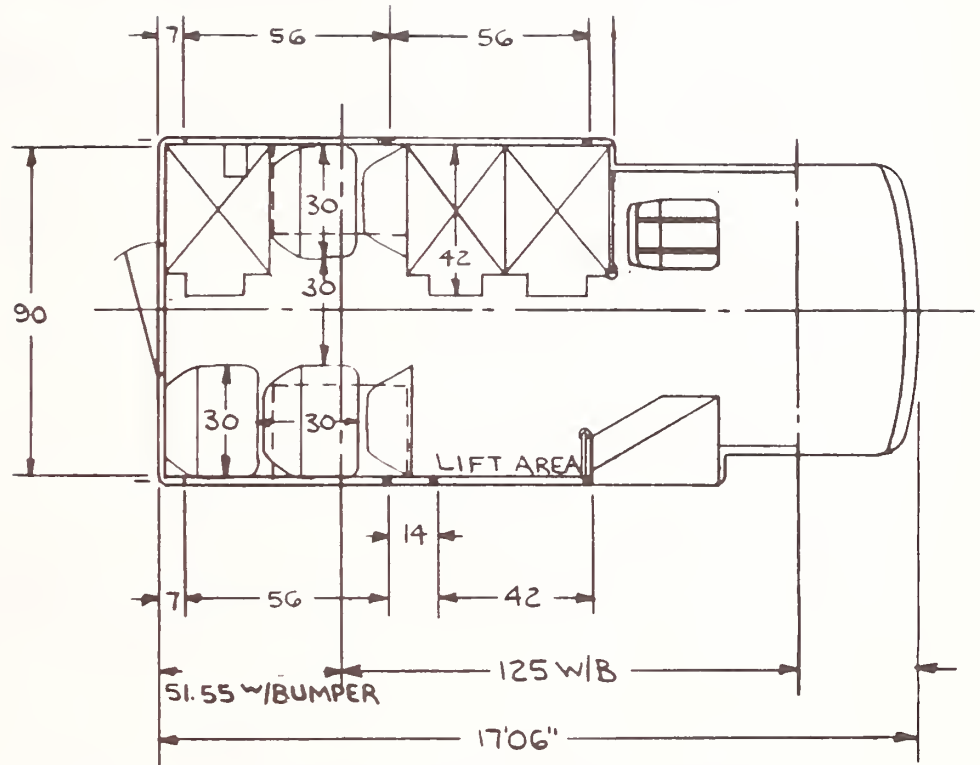
2 passenger fold-up seat



1 Jump Seat Position
at each location

2 Jump Seat Positions
(may be 2-single position
jump seats or 1 - 2 position
jump seat)

Comparable to PennDOT Spec A/J - Accessible
Eleven (11) Passenger Small Transit Bus



SCALE $\frac{1}{4}" = 1'$ MATERIAL $27\frac{1}{2}"$ PER WHEELCHAIR

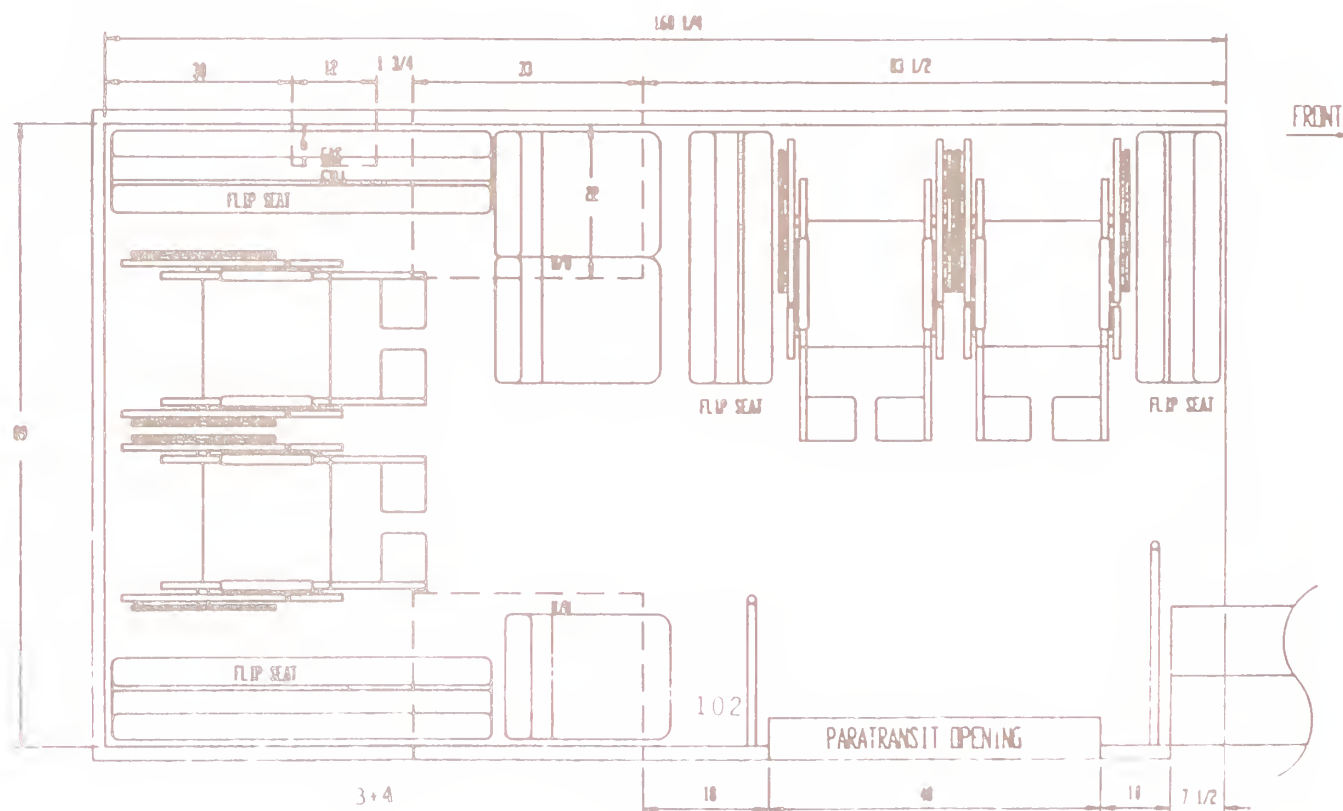
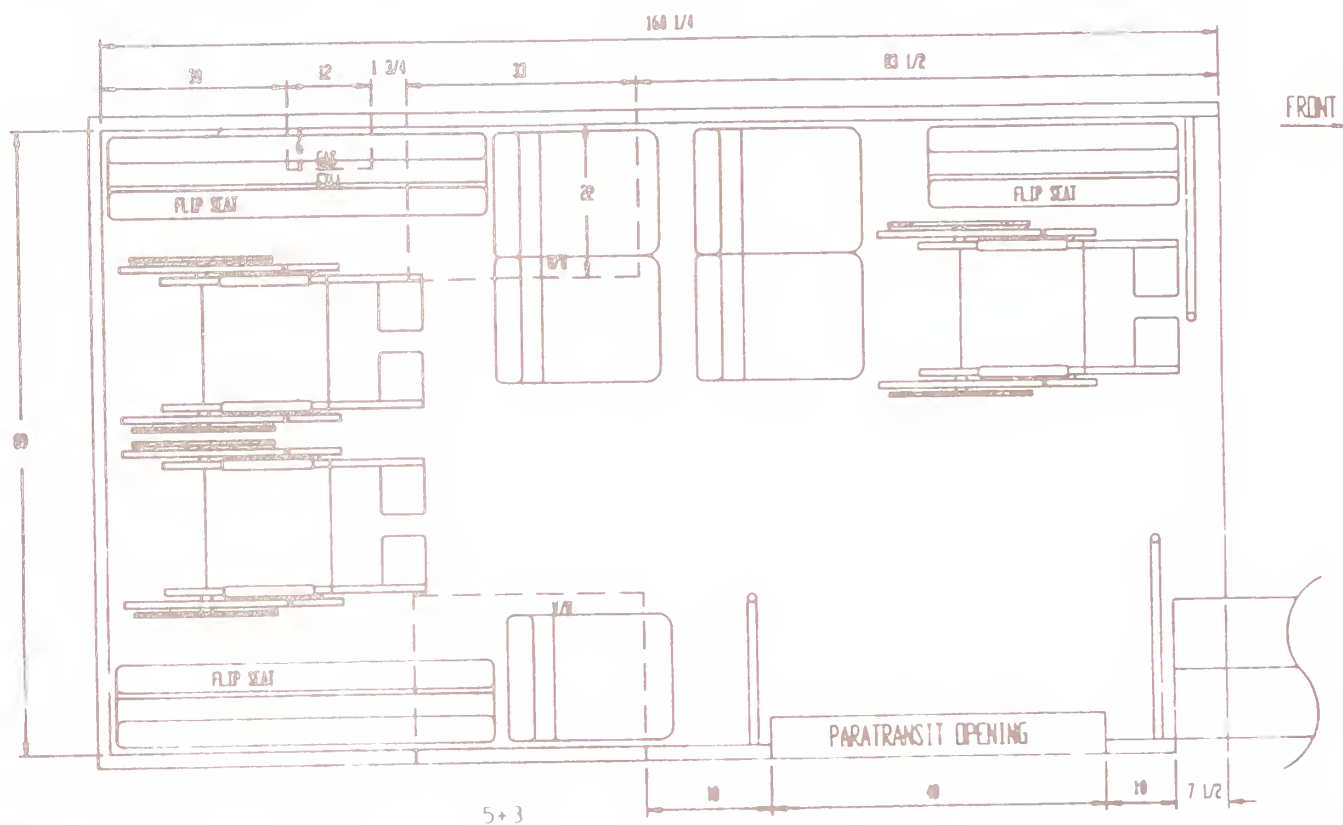
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
6	3	9

NOTE:

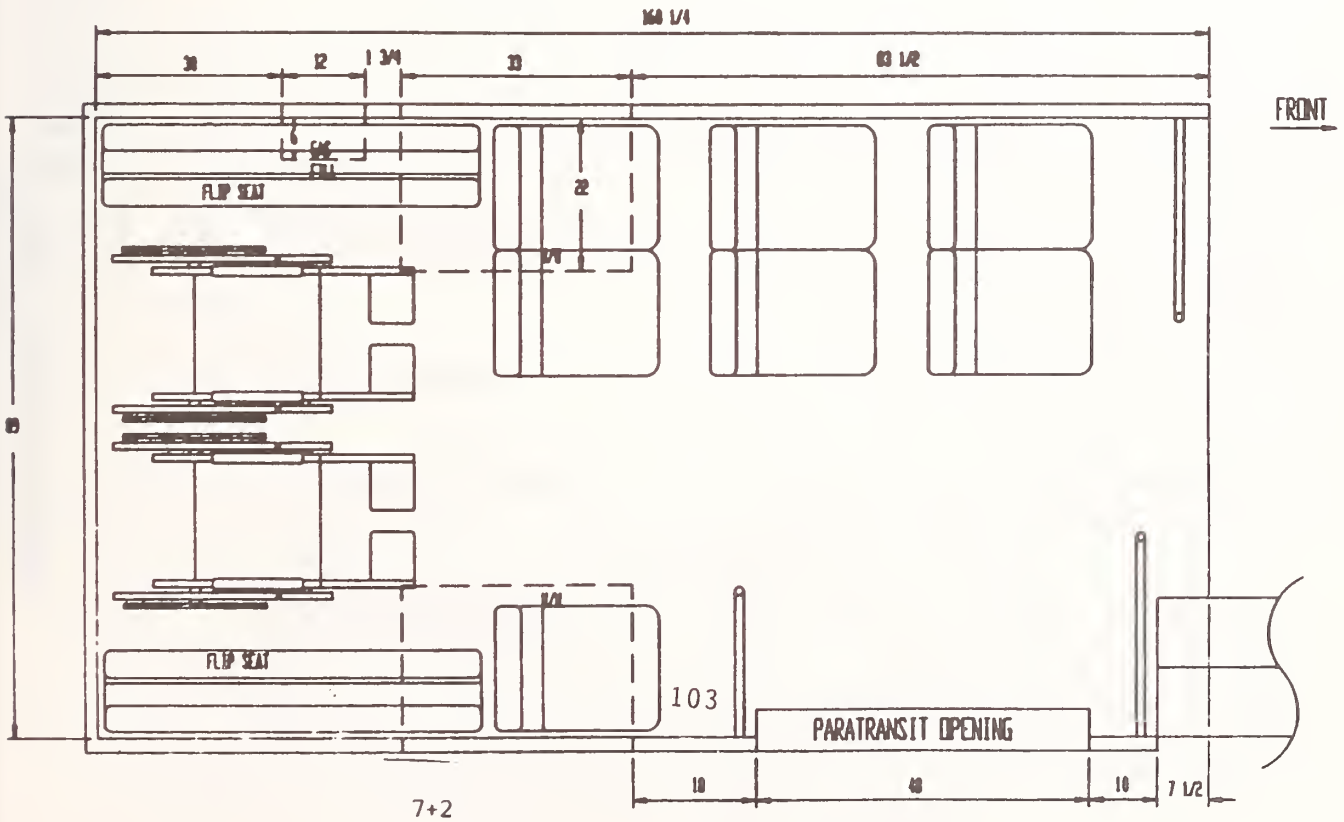
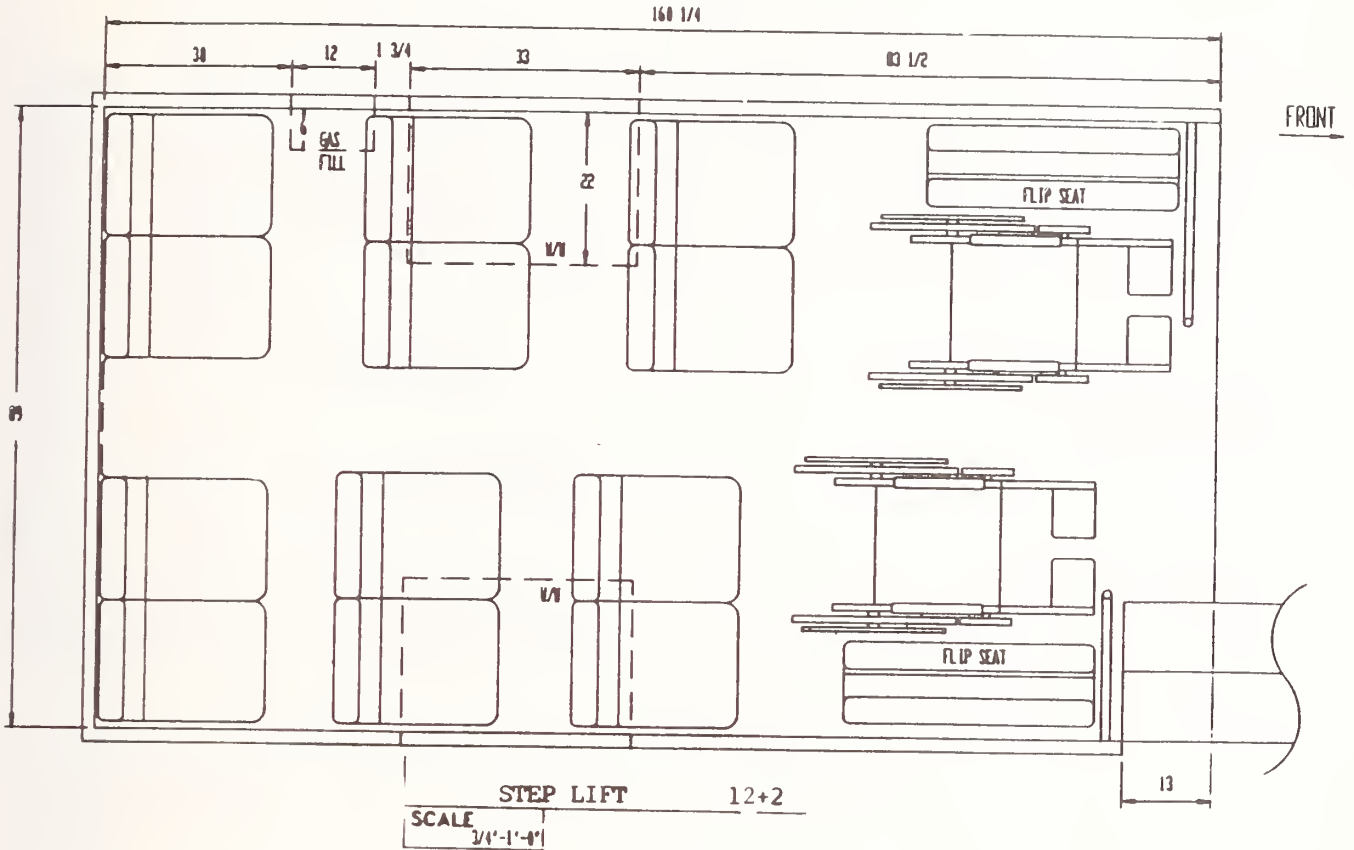
HEATER SHALL BE MOUNTED IN THE
RIGHT REAR 25" FROM THE REAR
WALL TO THE FRONT OF THE HEATER.

2-2 SEATING

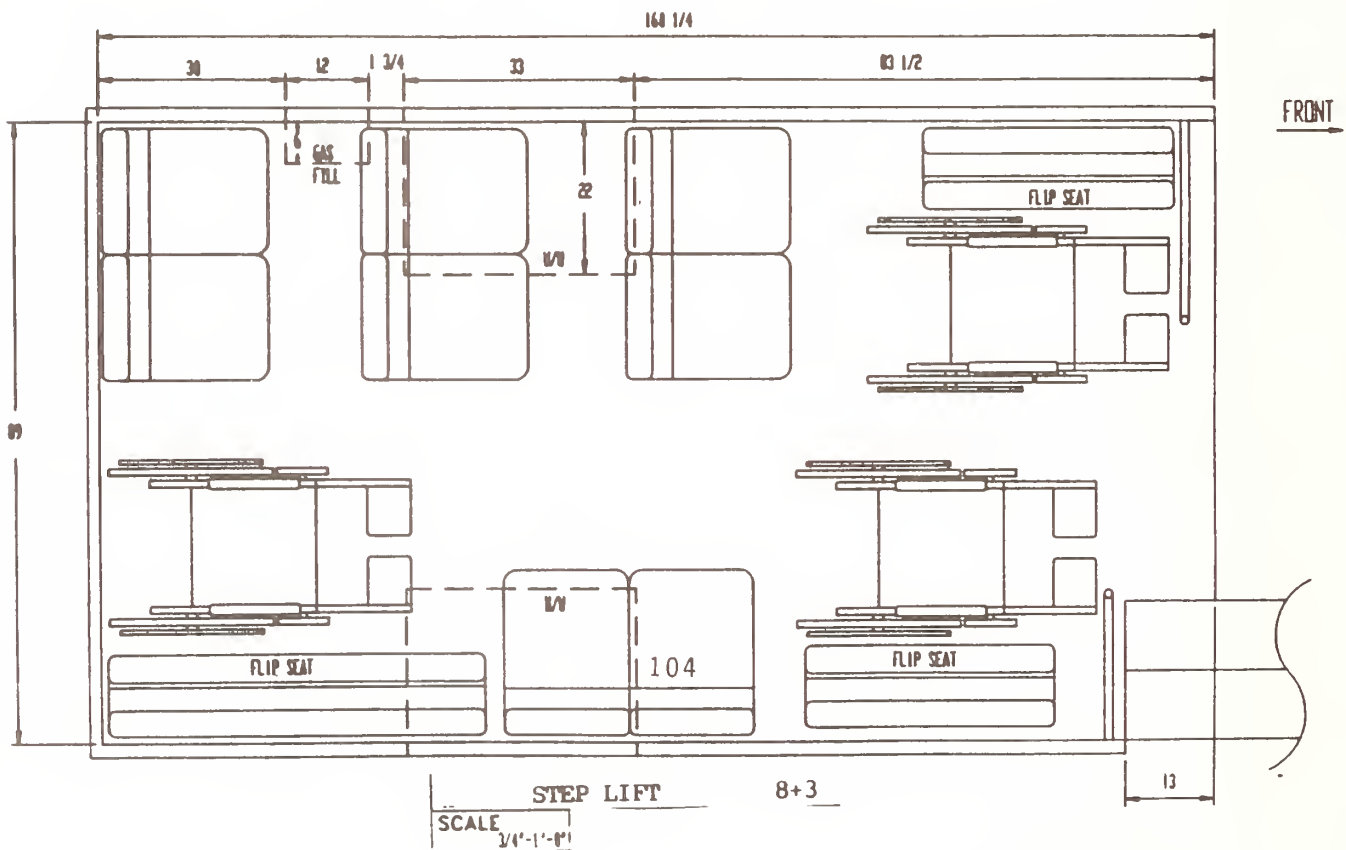
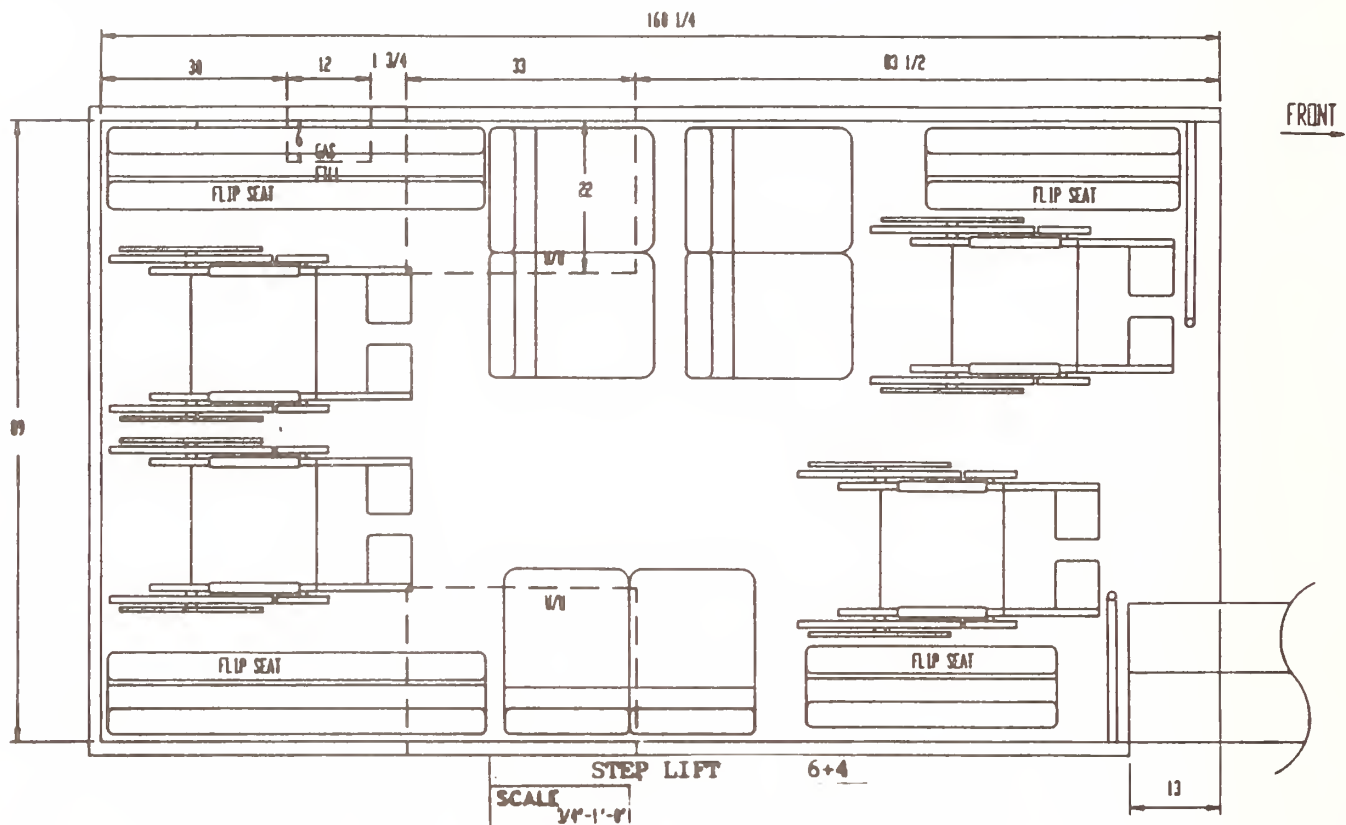
Comparable to PennDOT Spec A/J - Accessible
Eleven (11) Passenger Small Transit Bus

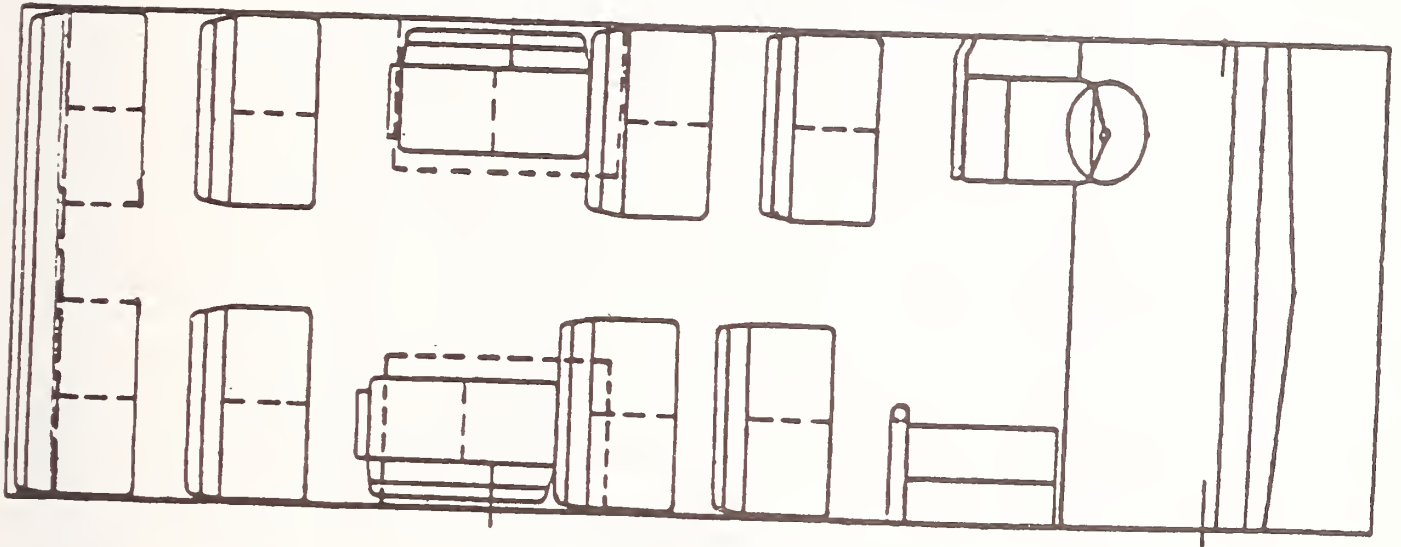


Comparable to PennDOT Spec A/J - Accessible
Eleven (11) Passenger Small Transit Bus



Comparable to PennDOT Spec A/J - Accessible
Eleven (11) Passenger Small Transit Bus





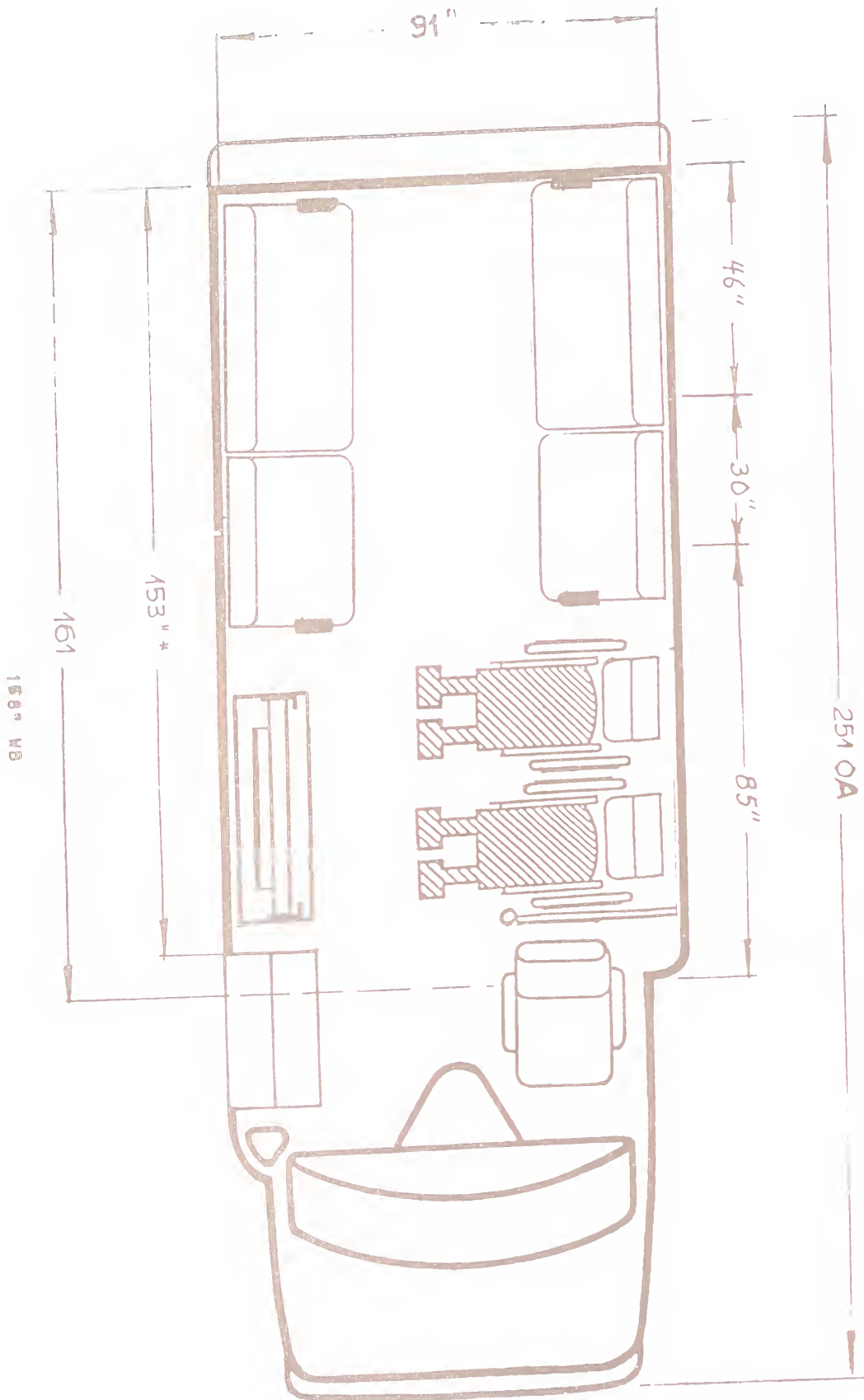
20 Passenger; No Lift



20 Passenger Perimeter Seating

Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus

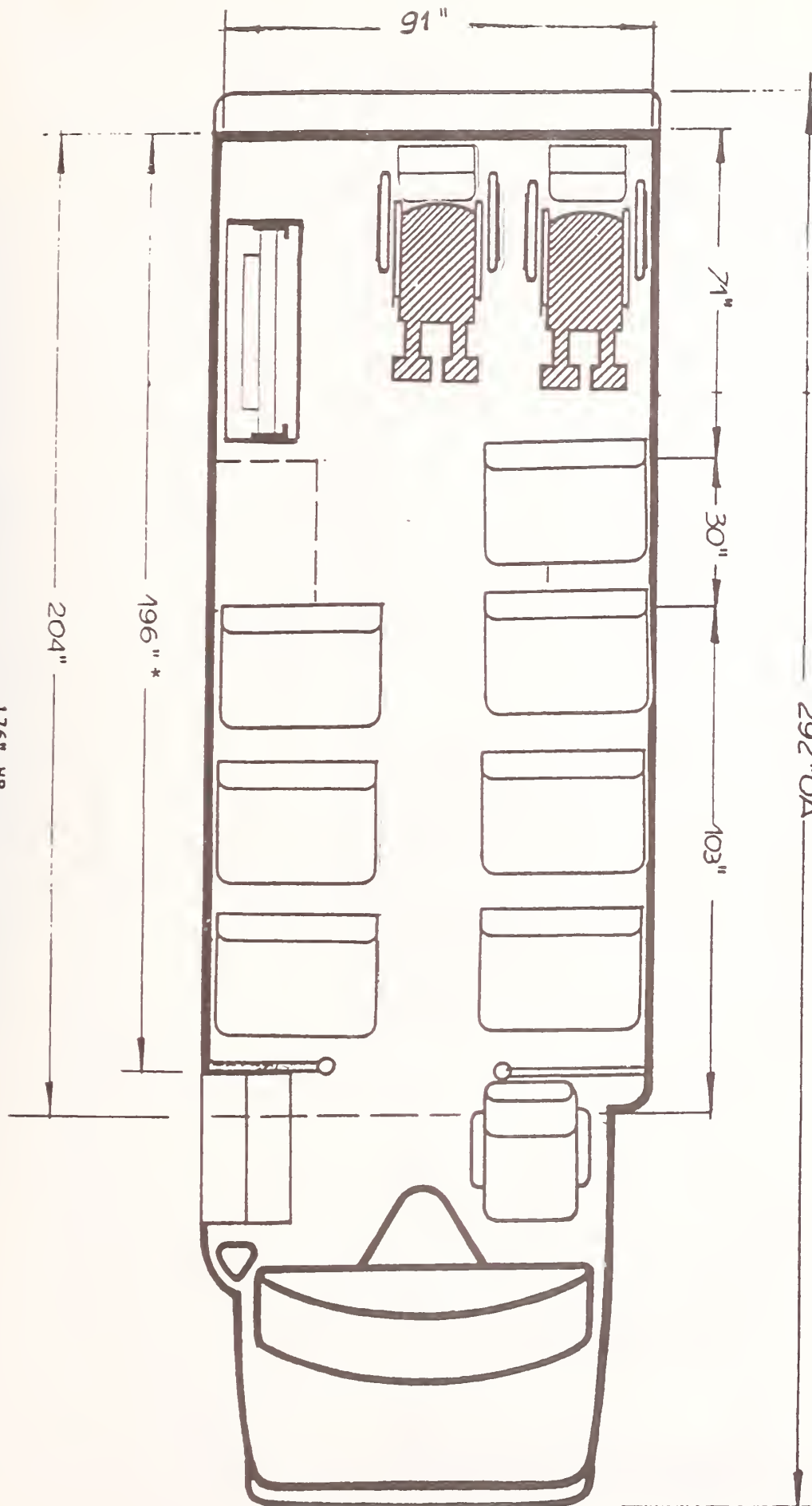
10 PASSENGER PLUS 2 WHEELCHAIR POSITIONS



Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus

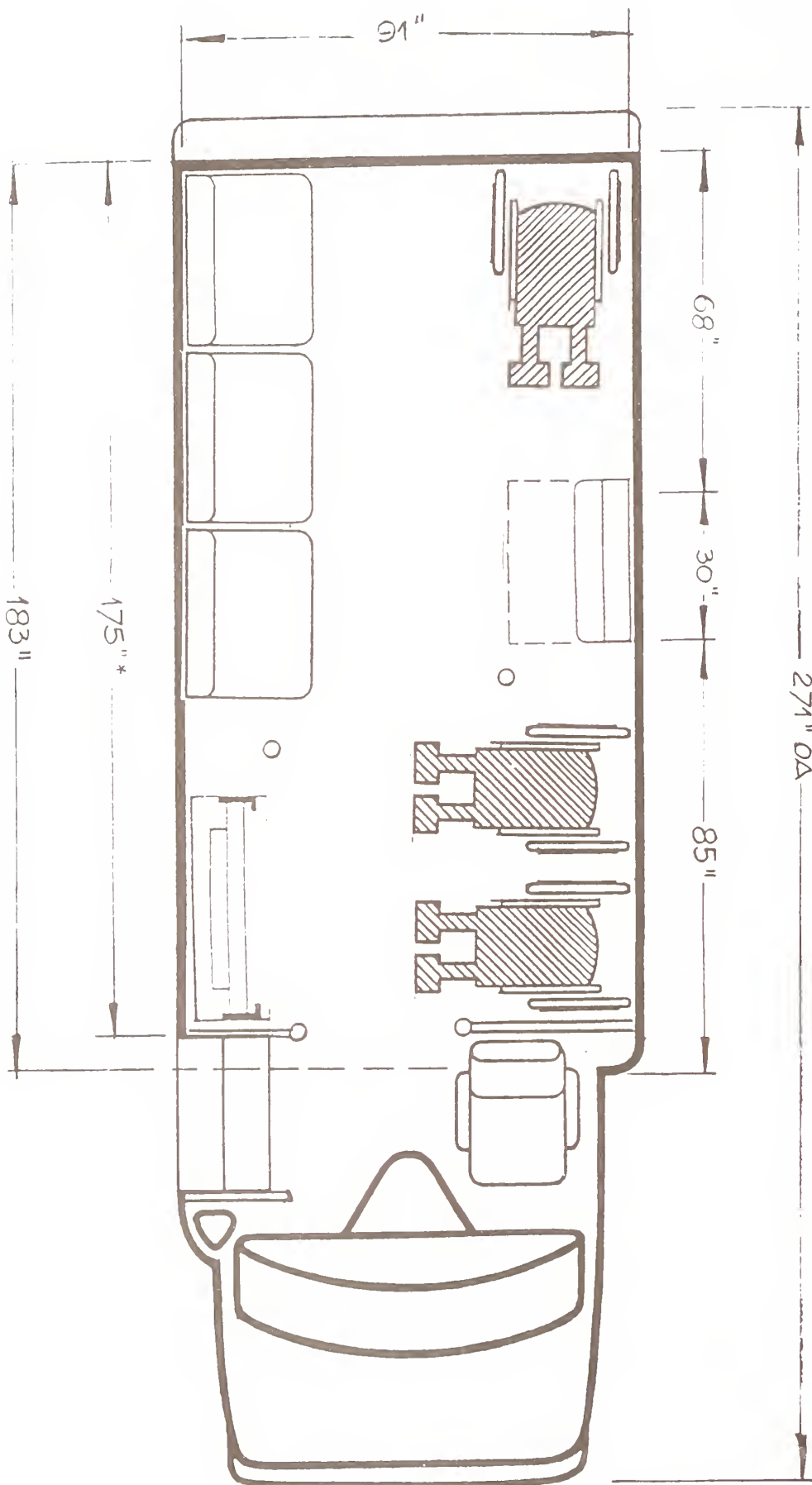
14 PASSENGER PLUS TWO WHEELCHAIR POSITIONS

292"OA



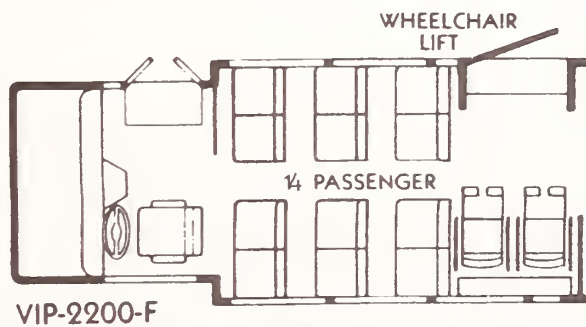
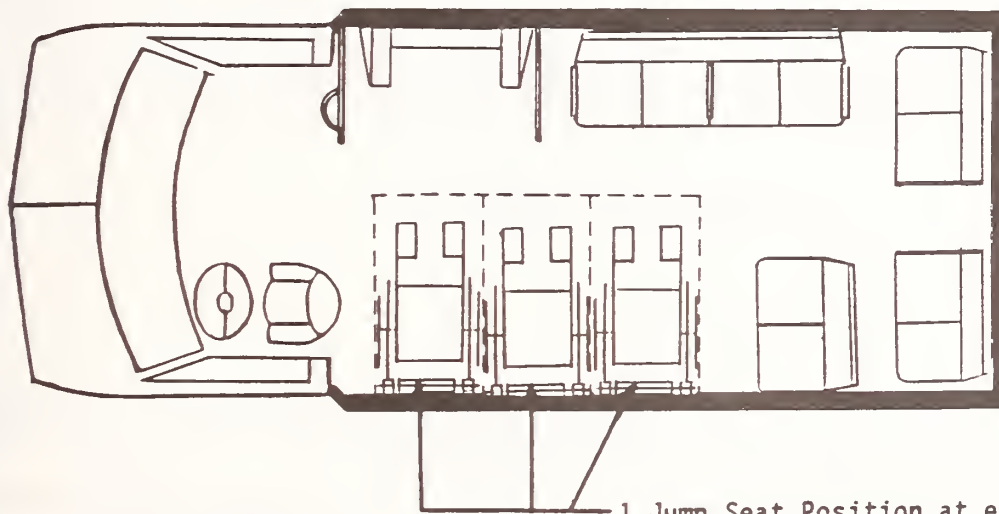
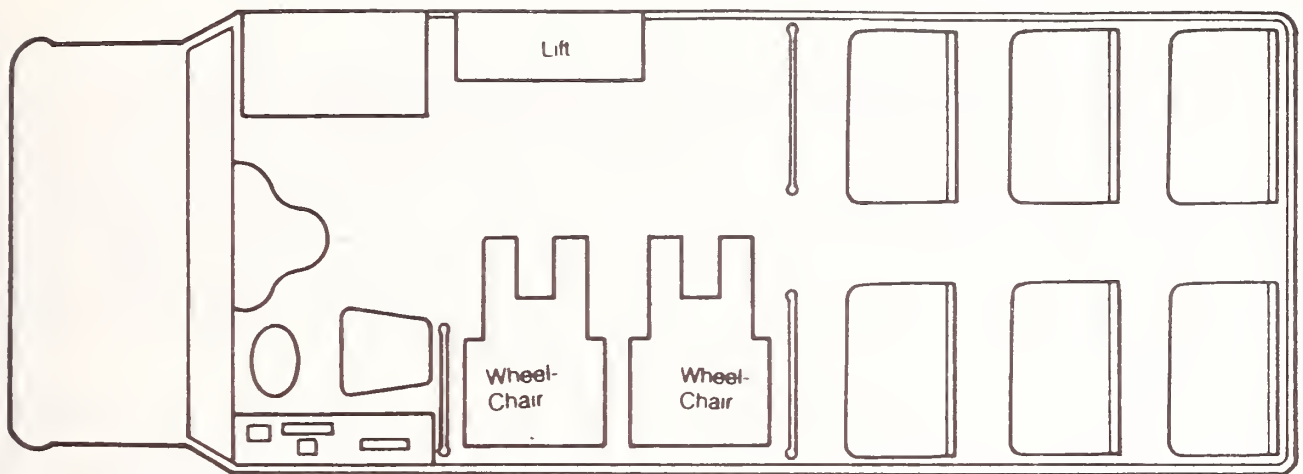
Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus

8 Passenger and 3 Wheelchair Positions



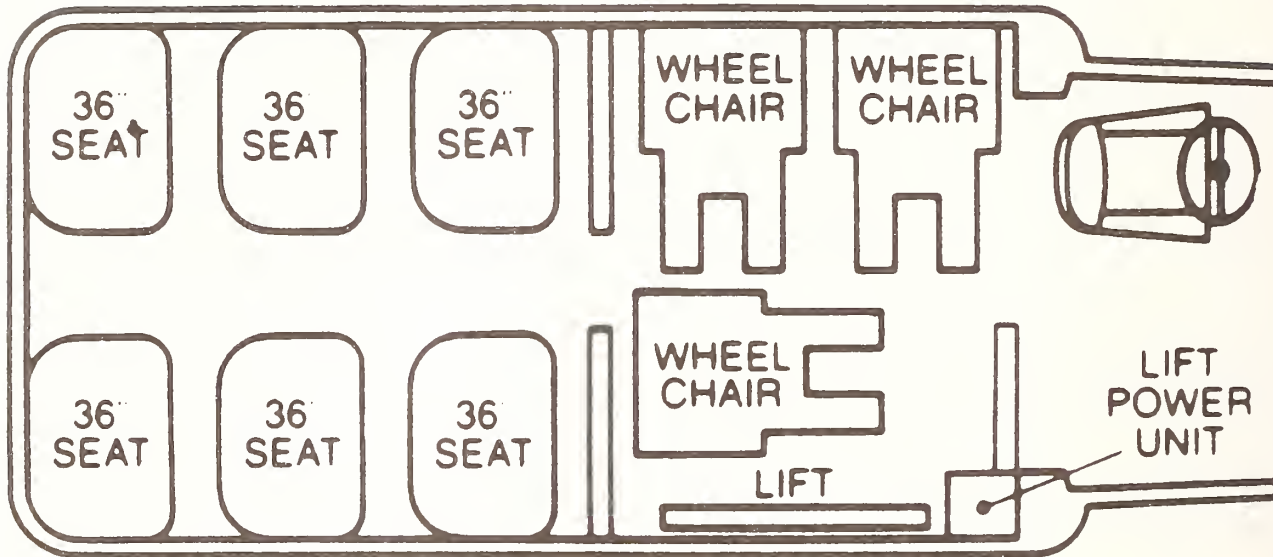
158" WB

Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus

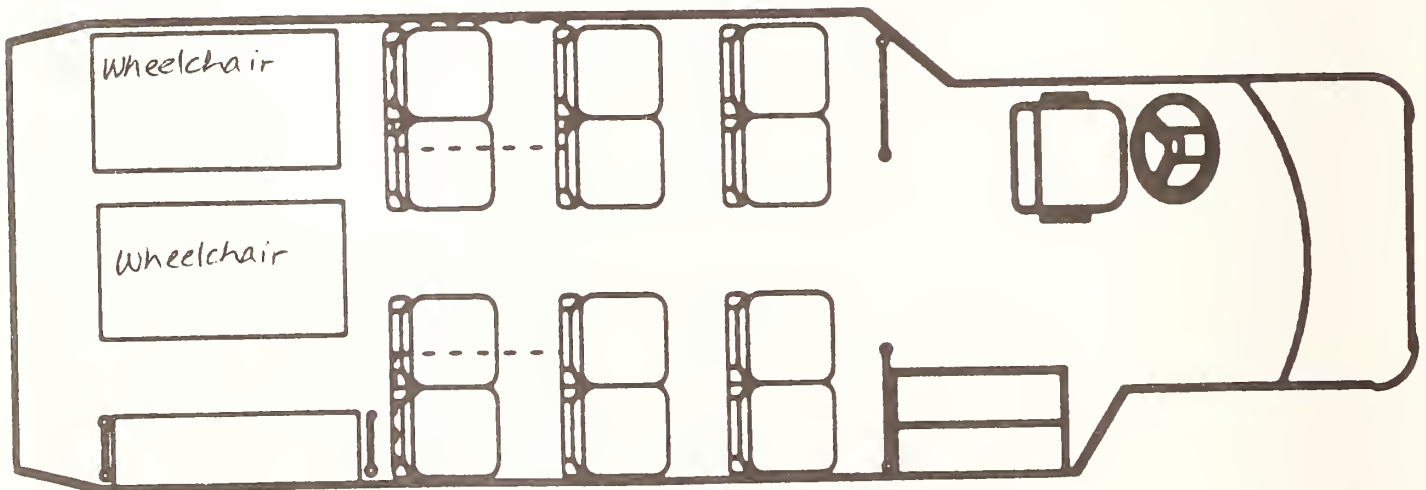


VIP-2200-F

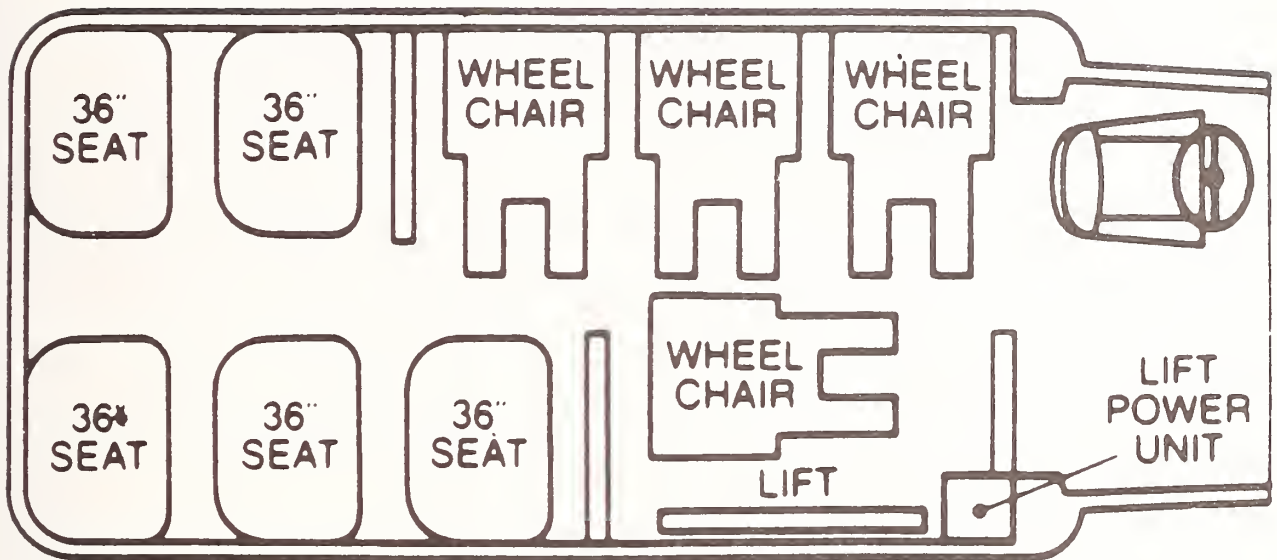
MODEL	WHEEL BASE	EXTERIOR			INTERIOR WIDTHS			AISLE HEIGHT
		LENGTH	WIDTH	HEIGHT	FLOOR	HIP	SHOULDER	
VIP 2200	158"	269"	96"	112"	93"	93"	90"	75 1/4"



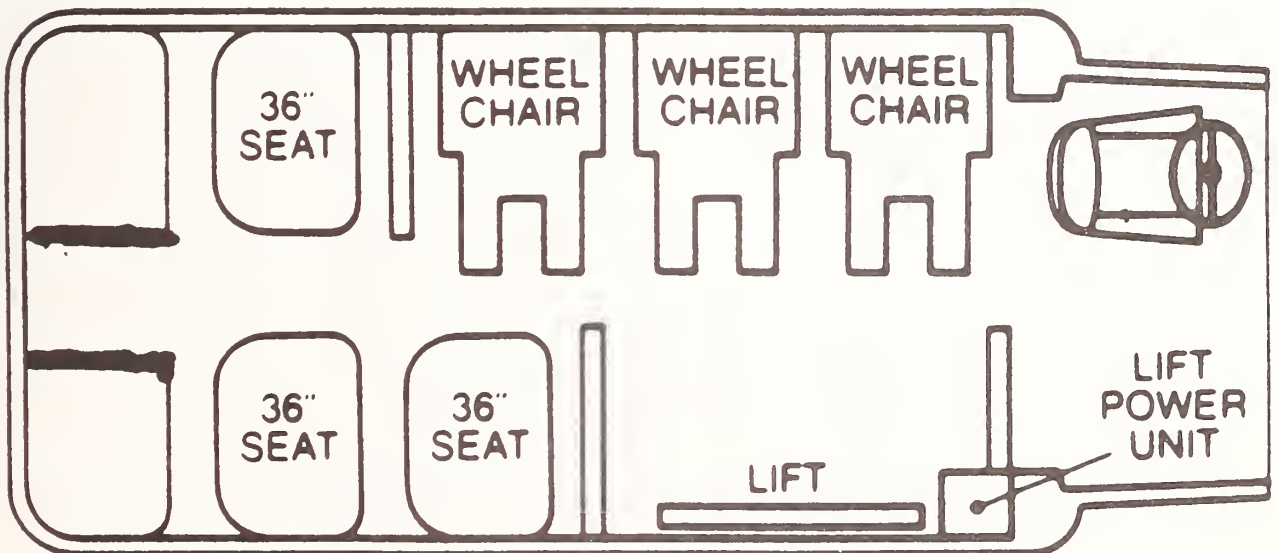
15 passengers



2 W.C. 12 Passenger

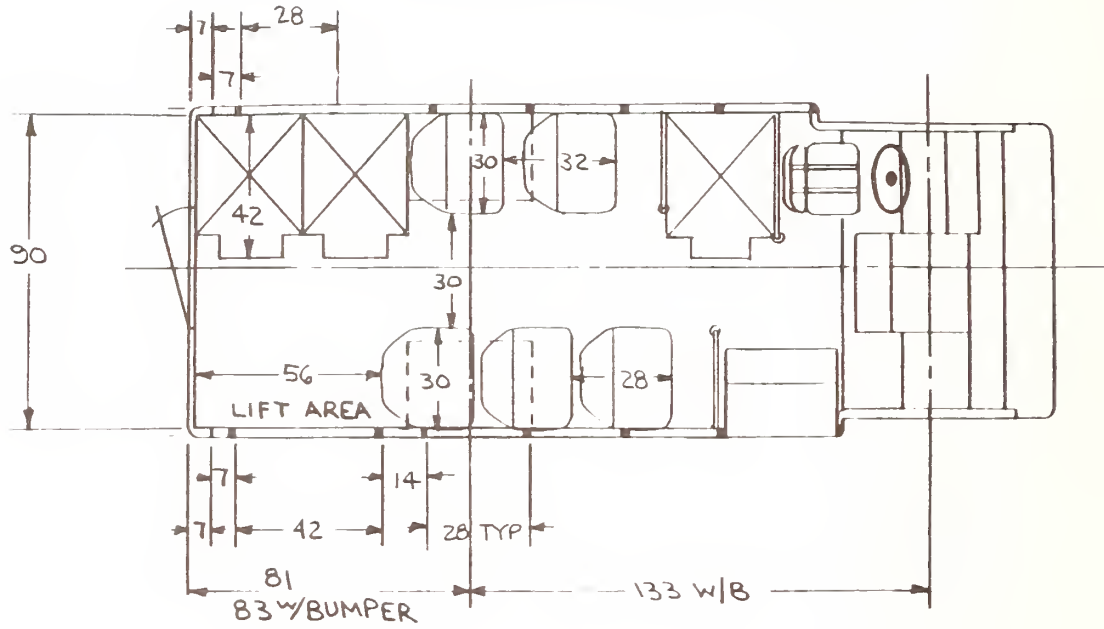


14 passengers

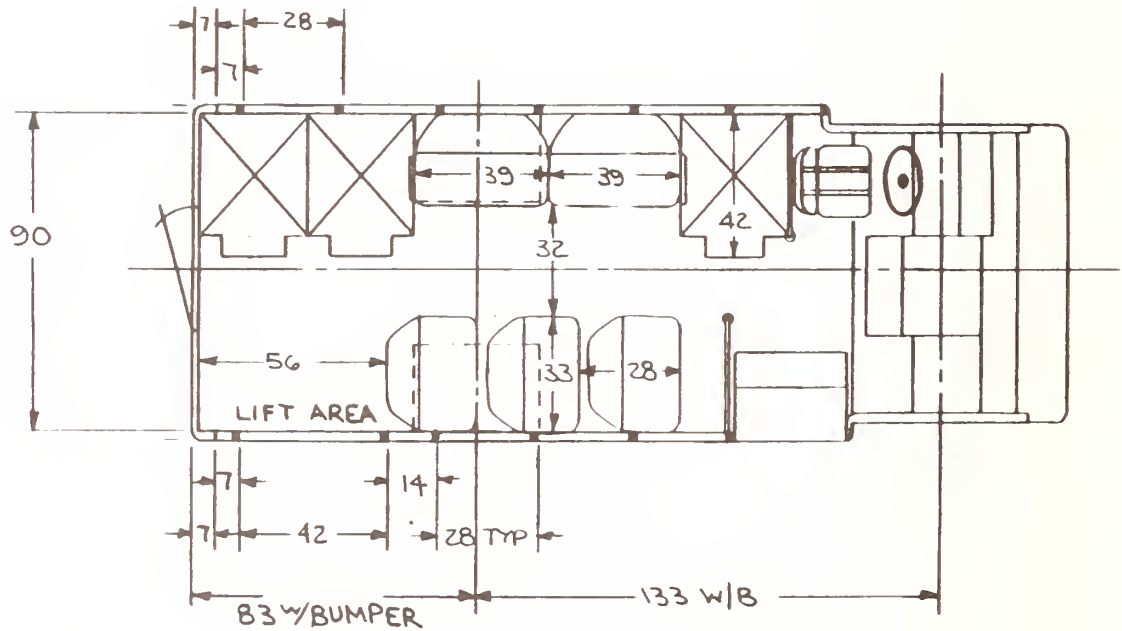


13 passengers

Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus

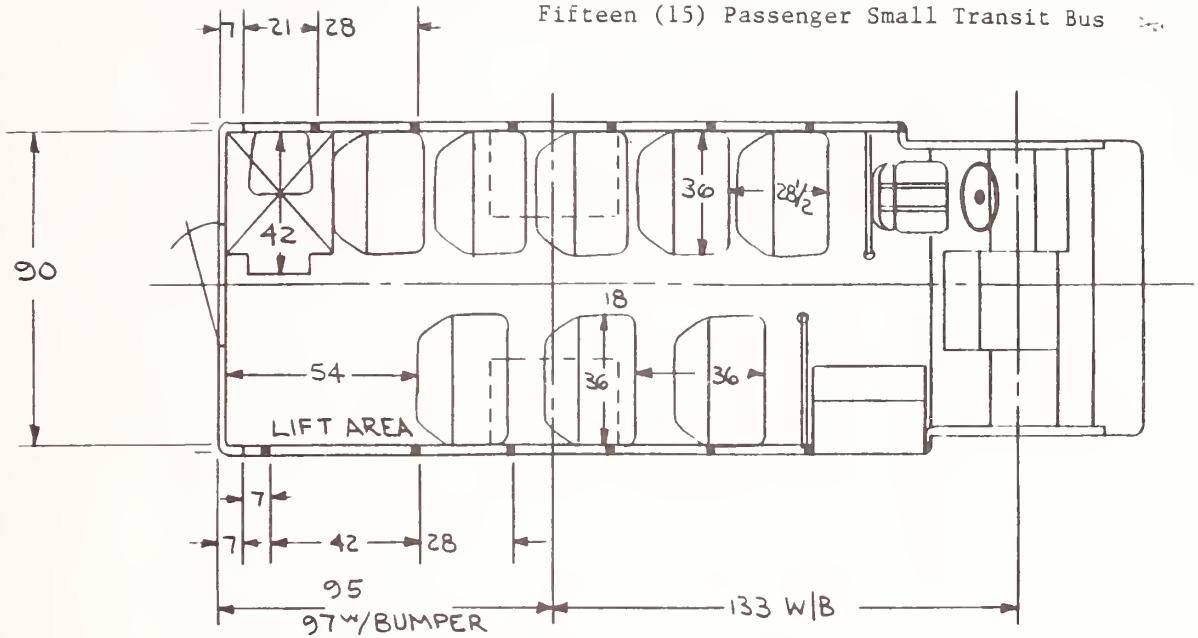


SCALE	MATERIAL	NUMBER OF PASSENGERS		
1/4" = 1'	30" PER WHEELCHAIR	SEATED	WHEELCHAIR	TOTAL
		10	3	13



SCALE	MATERIAL	NUMBER OF PASSENGERS		
1/4" = 1'	29" PER WHEELCHAIR	SEATED	WHEELCHAIR	TOTAL
		10	3	13

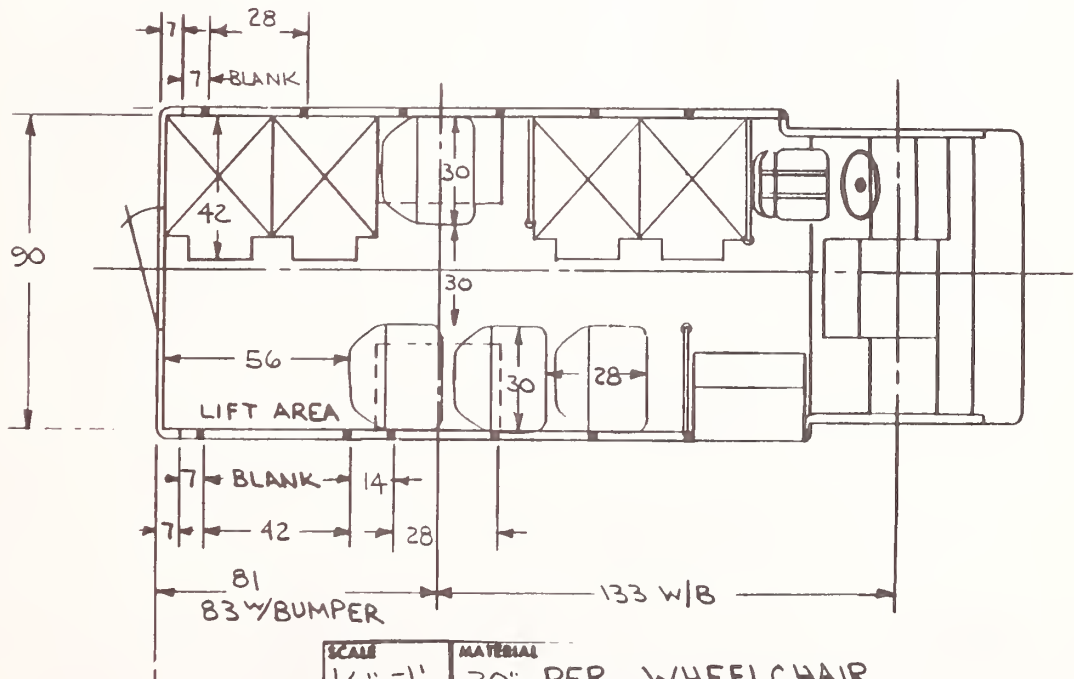
Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus



SCALE $\frac{1}{4}" = 1'$ MATERIAL 30" PER WHEELCHAIR

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
16	1	17
17	0	17

Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus



SCALE $\frac{1}{4}" = 1'$ MATERIAL 30" PER WHEELCHAIR

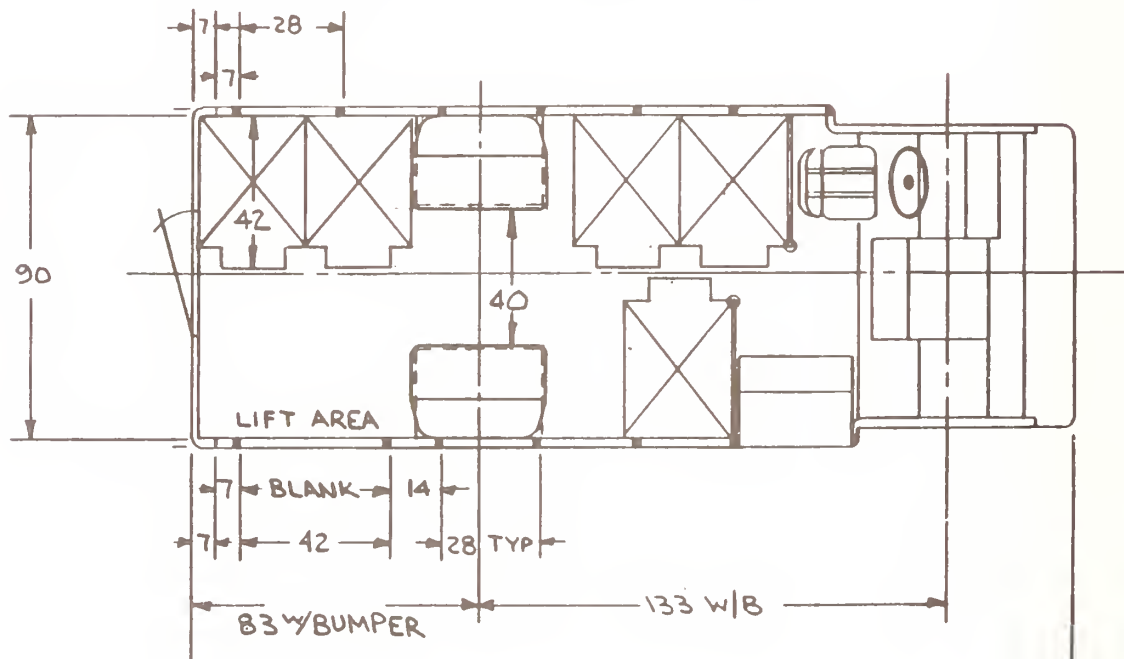
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
8	4	12

Hand-drawn technical drawing of a vehicle chassis layout, showing dimensions and components. The drawing is oriented horizontally, with the front of the vehicle on the right.

Dimensions:

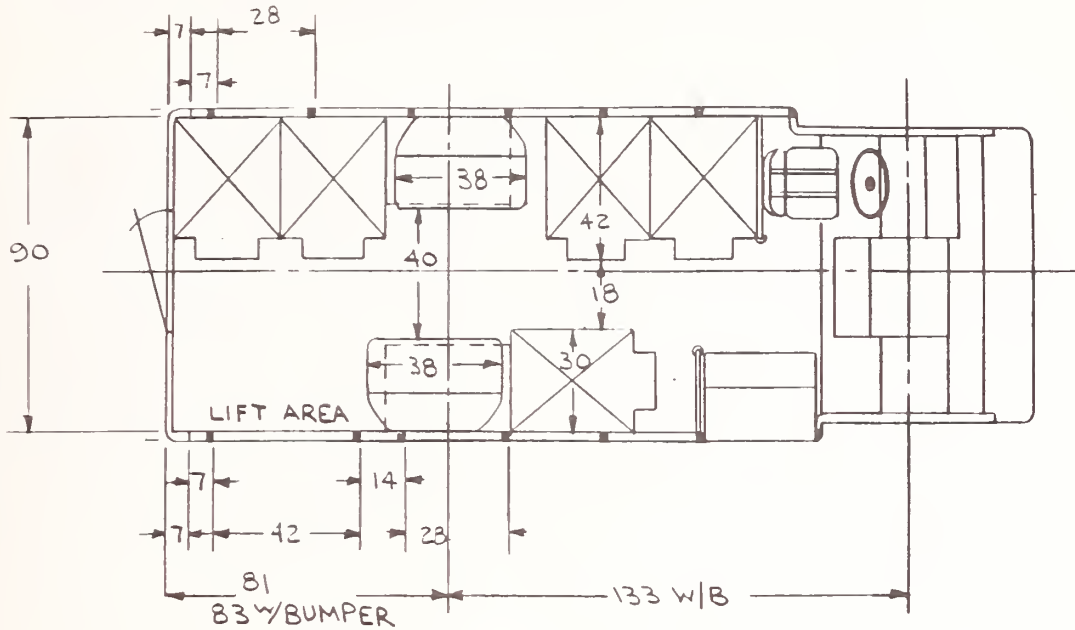
- Overall Width:** 81 (labeled at the bottom left).
- Overall Length:** 133 w/B (labeled at the bottom right, indicating width with bumper).
- Front End Components (Right Side):**
 - Two circular components (likely headlights or mirrors) are shown.
 - A vertical dimension of 15 is indicated near the front end.
- Internal Layout and Dimensions:**
 - Top Section:**
 - Two large rectangular areas with diagonal cross-hatching, each with a width of 42.
 - A central rectangular area with a width of 45.
 - Vertical dimensions of 32 and 42 are indicated.
 - Bottom Section:**
 - A large rectangular area labeled "LIFT AREA" with a width of 56.
 - Two smaller rectangular areas with widths of 33 and 28.
 - Vertical dimensions of 33 and 28 are indicated.
 - Side Dimensions:**
 - Top edge: 7, 28, 7.
 - Bottom edge: 7, 42, 14, 28.

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
9	4	13



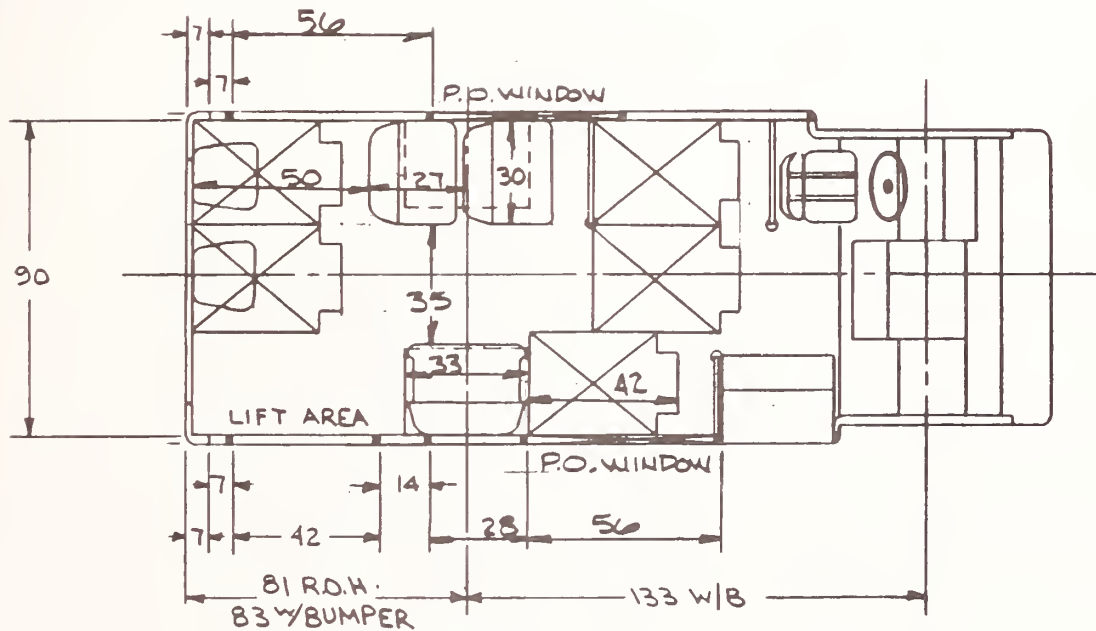
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
4	5	9

Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus



SCALE 1/4" = 1' MATERIAL 30" PER WHEELCHAIR

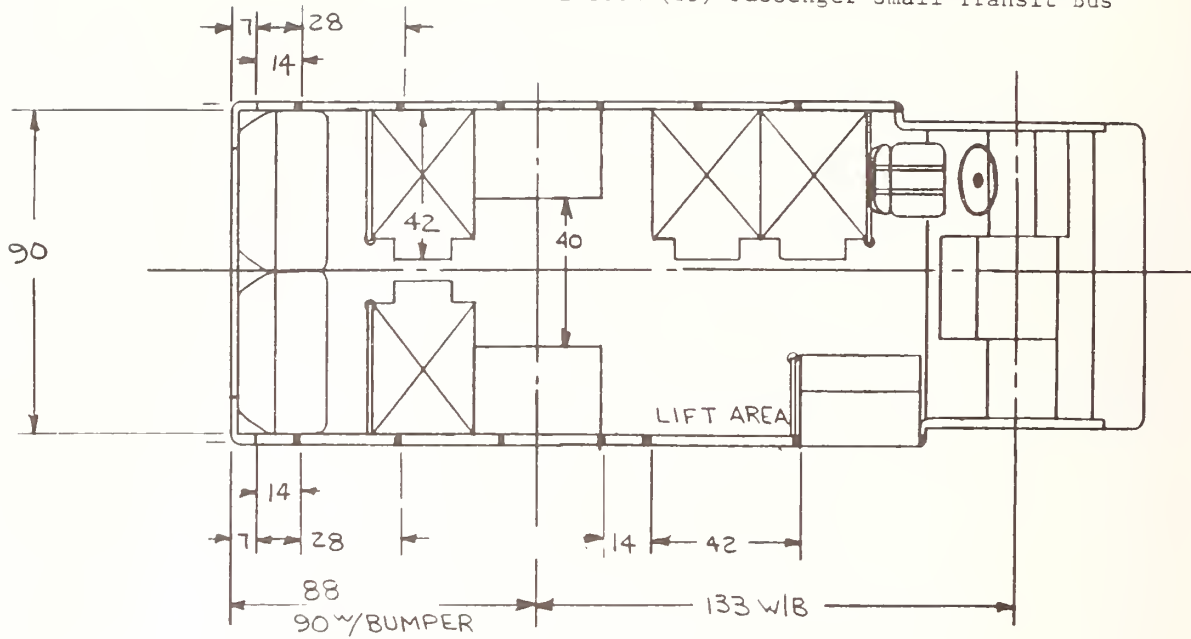
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
4	5	9



SCALE 1/4" = 1' MATERIAL 30" PER WHEELCHAIR

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
6	5	11
8	3	11

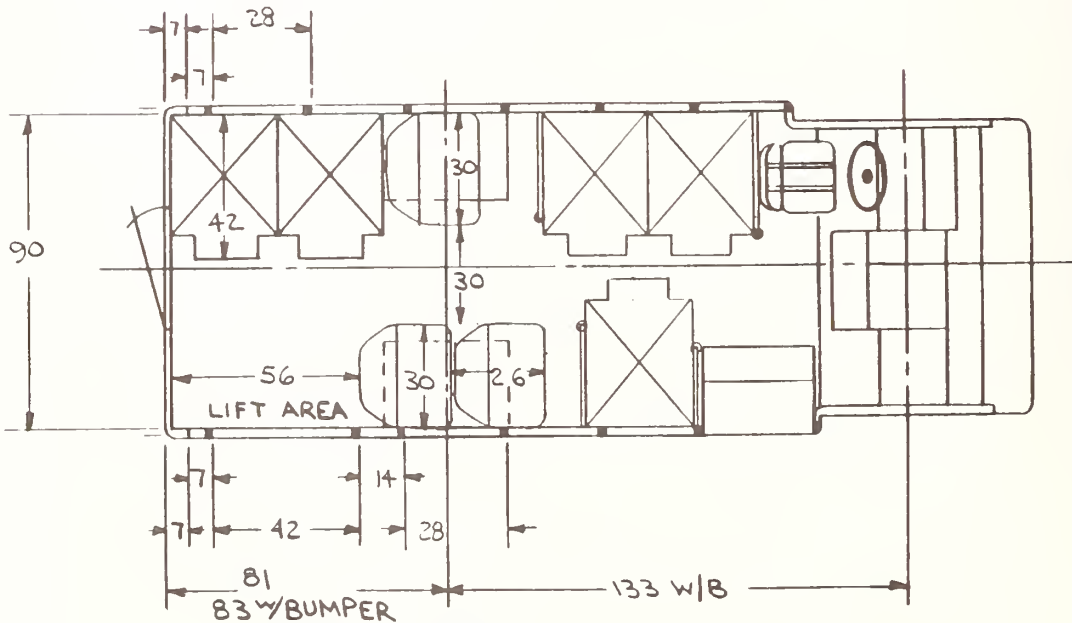
Comparable to PennDOT Spec A/K - Accessible
Fifteen (15) Passenger Small Transit Bus



SCALE $\frac{1}{4}$ MATERIAL 30" PER WHEELCHAIR

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
5	4	9

DAVENPORT SEATING



SCALE $\frac{1}{4} = 1'$ MATERIAL 30" PER WHEELCHAIR

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
6	5	11

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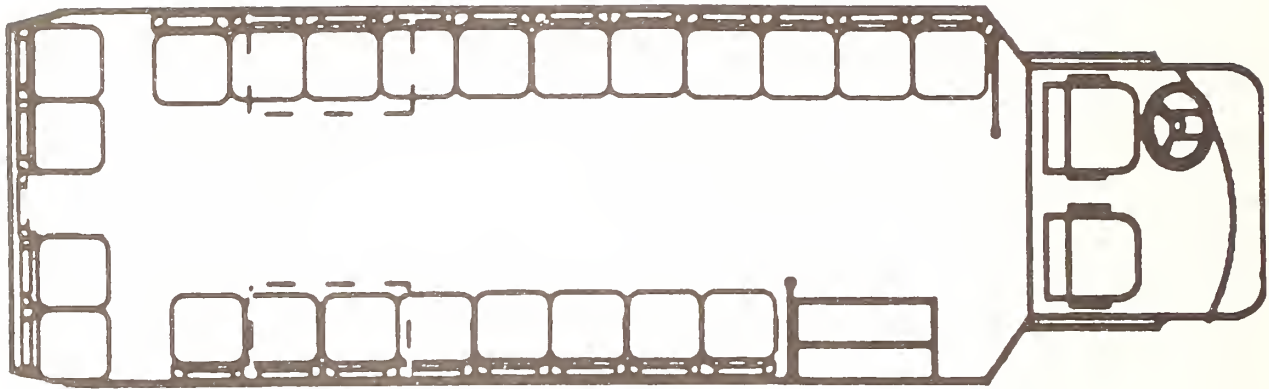
Technical drawing of a vehicle interior layout, showing two rows of seats and dimensions. The drawing includes the following dimensions:

- Overall width: 99 (101 W/BUMPER)
- Overall length: 157 W/D
- Seat width (left row): 33
- Seat width (right row): 32 1/4
- Seat width (rear row): 39
- Seat width (front row): 18
- Seat height: 24
- Seat pitch (left row): 21
- Seat pitch (right row): 28
- Seat pitch (rear row): 21
- Seat pitch (front row): 28
- Overall height: 90

Technical drawing of a vehicle chassis layout, showing dimensions and component placement. The drawing is oriented horizontally, with the front of the vehicle on the left and the rear on the right. The overall width is 90 units. The overall length is 157 W/B (Wheelbase). The overall length including the bumper is 101 W/BUMPER. The drawing shows the front suspension, steering knuckle, and the main chassis frame. Key dimensions include: 7, 21, 56, 28, 32, 36, 10, 16, 29 1/4, 10, 56, 56, 56, 99, 101 W/BUMPER, 157 W/B. The drawing also shows the location of various components, including the front suspension, steering knuckle, and the main chassis frame. The drawing is a technical drawing of a vehicle chassis layout, showing dimensions and component placement. The drawing is oriented horizontally, with the front of the vehicle on the left and the rear on the right. The overall width is 90 units. The overall length is 157 W/B (Wheelbase). The overall length including the bumper is 101 W/BUMPER. The drawing shows the front suspension, steering knuckle, and the main chassis frame. Key dimensions include: 7, 21, 56, 28, 32, 36, 10, 16, 29 1/4, 10, 56, 56, 56, 99, 101 W/BUMPER, 157 W/B. The drawing also shows the location of various components, including the front suspension, steering knuckle, and the main chassis frame.

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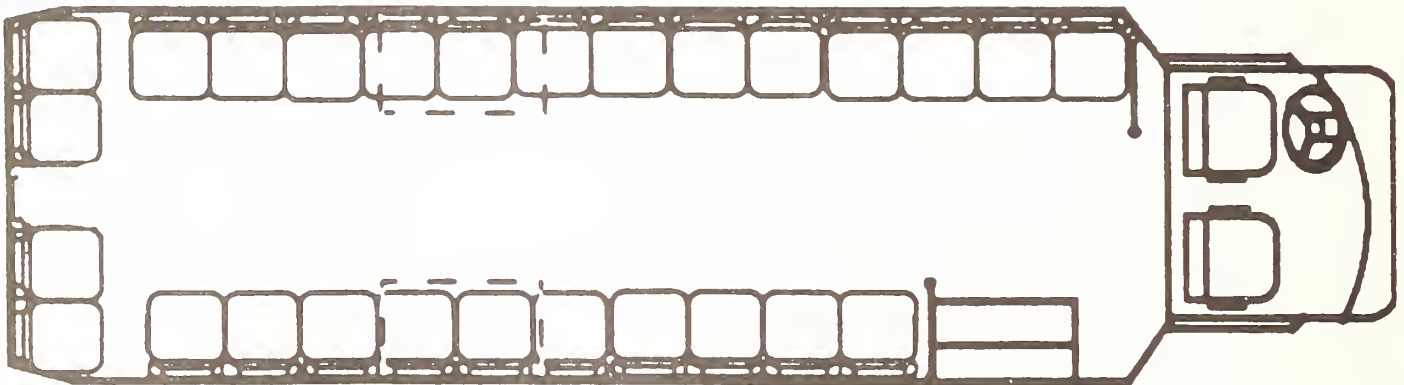
Comparable to PennDOT Spec L -
Twenty-Four (24) Passenger Small Transit Bus



24 Passenger Perimeter Seats

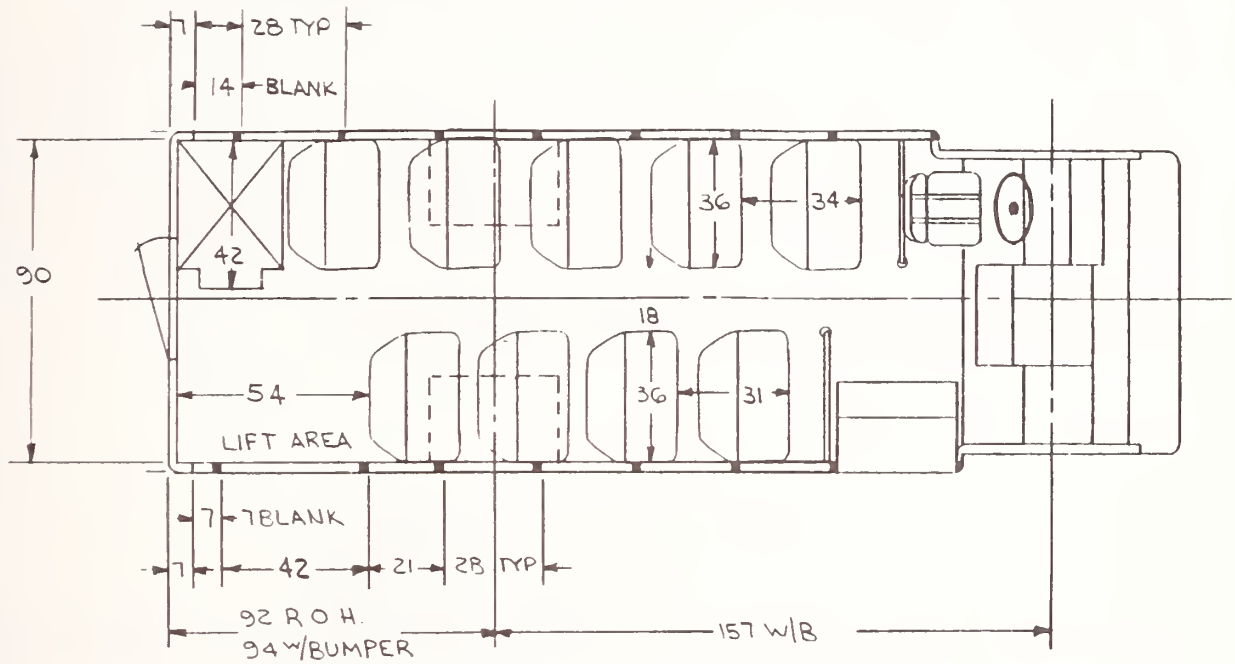


Comparable to PennDOT Spec M -
Twenty-eight (28) Passenger Small Transit Bus

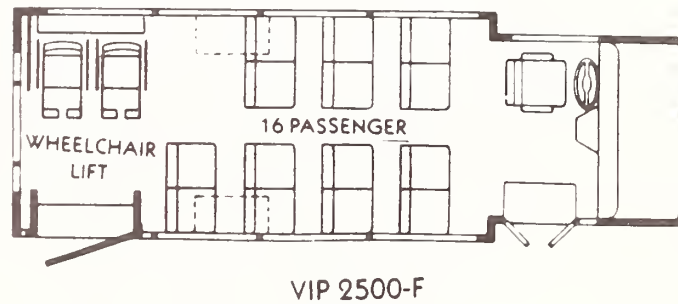
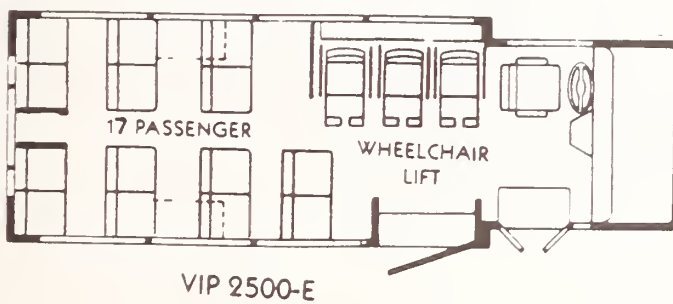


28 Passenger Perimeter Seats

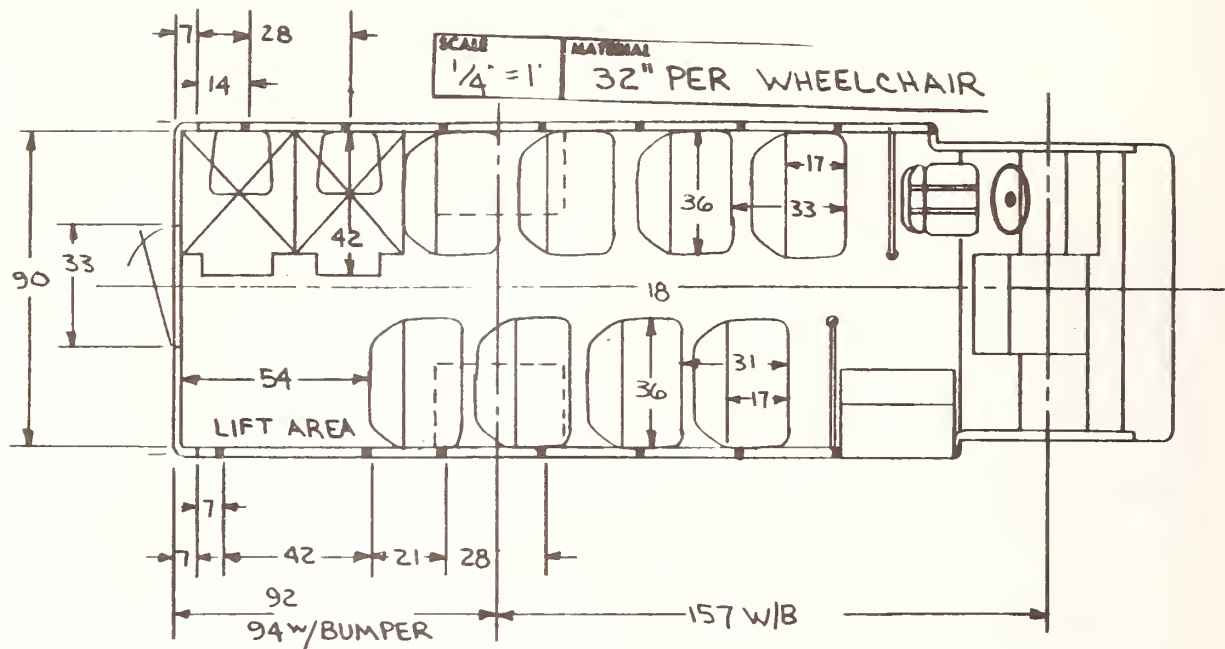
Comparable to PennDOT Spec A/L - Accessible
Nineteen (19) Passenger Small Transit Bus



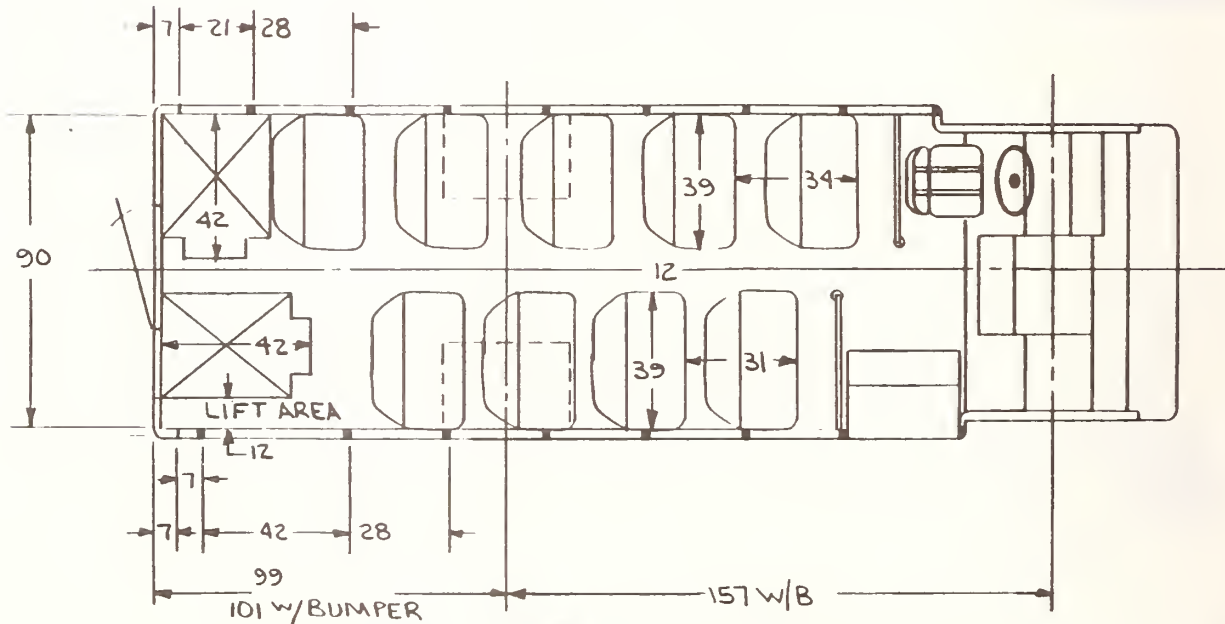
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
16	1	17



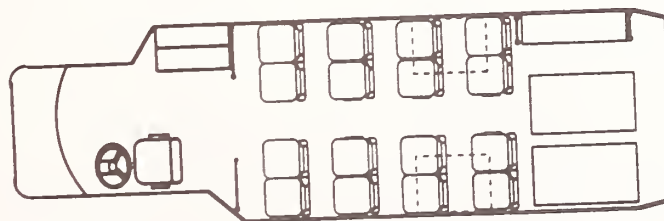
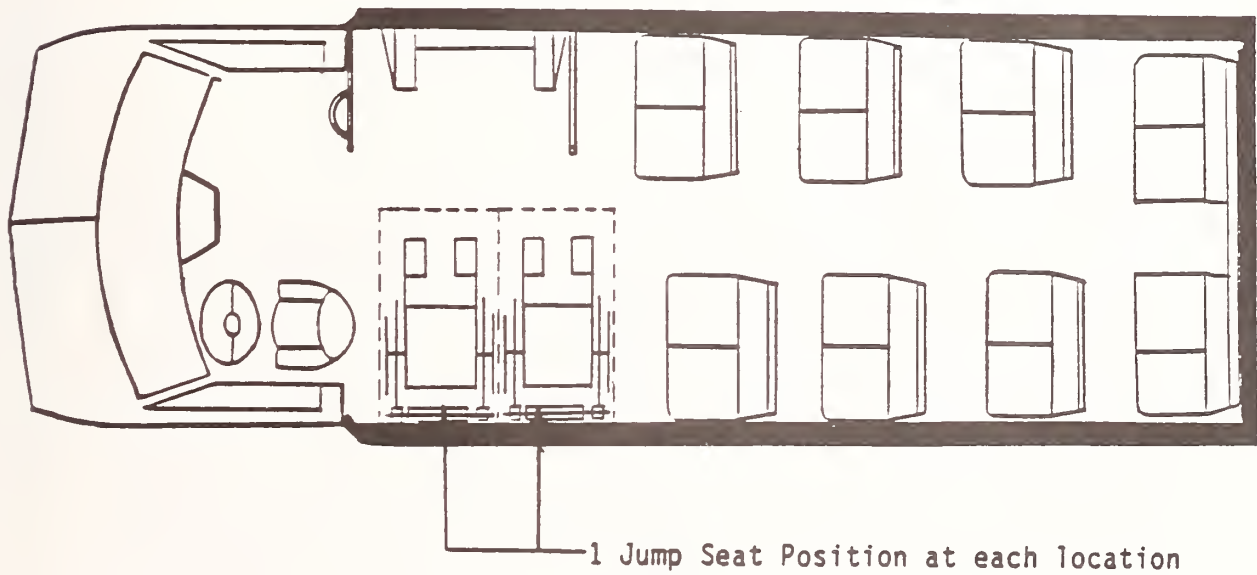
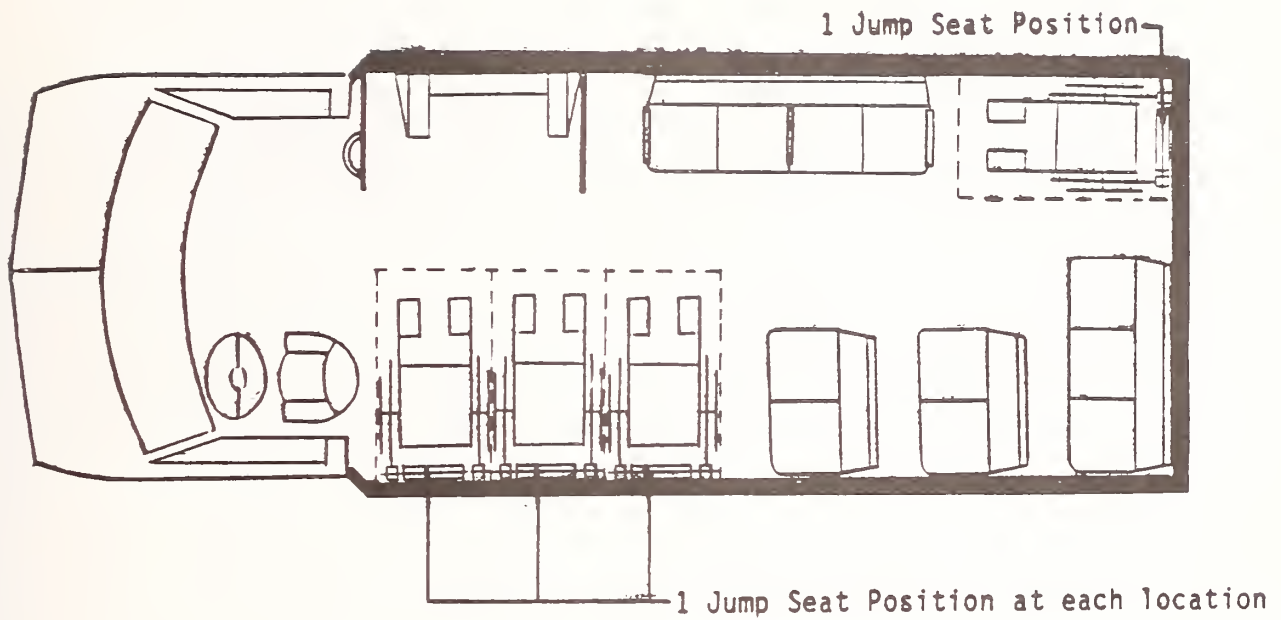
MODEL	WHEEL BASE	EXTERIOR			INTERIOR WIDTHS			AISLE HEIGHT
		LENGTH	WIDTH	HEIGHT	FLOOR	HIP	SHOULDER	
VIP 2500	176"	295"	96"	112"	93"	93"	90"	75 1/4"

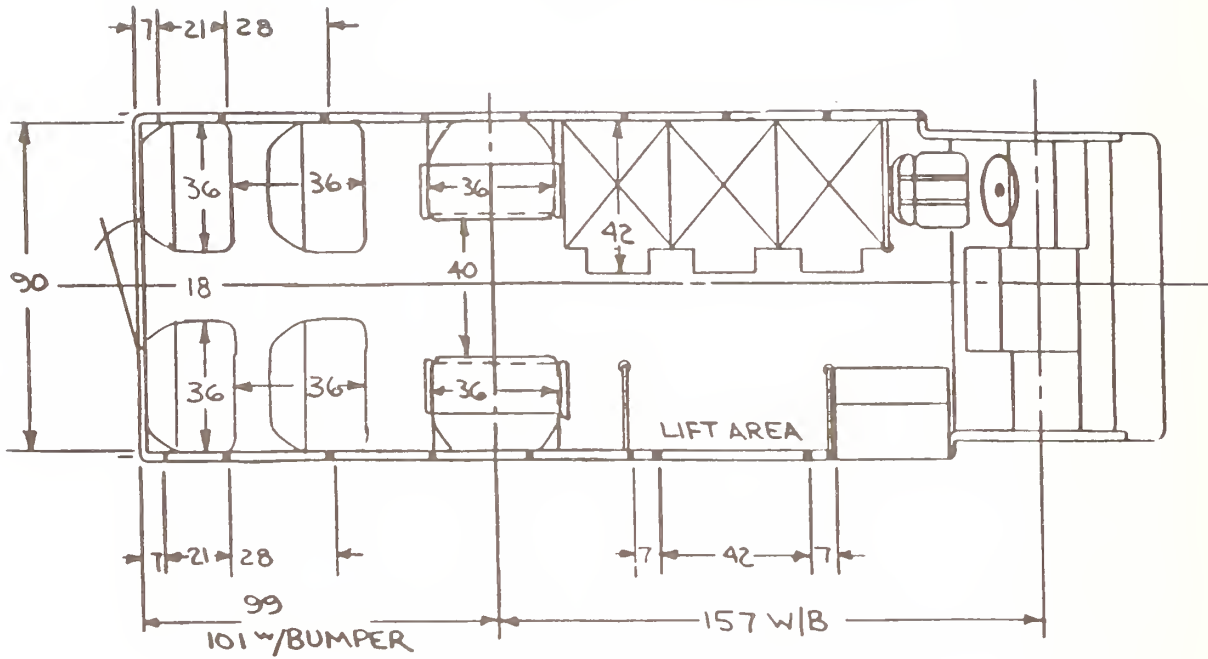


NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
16	2	18
18	0	18



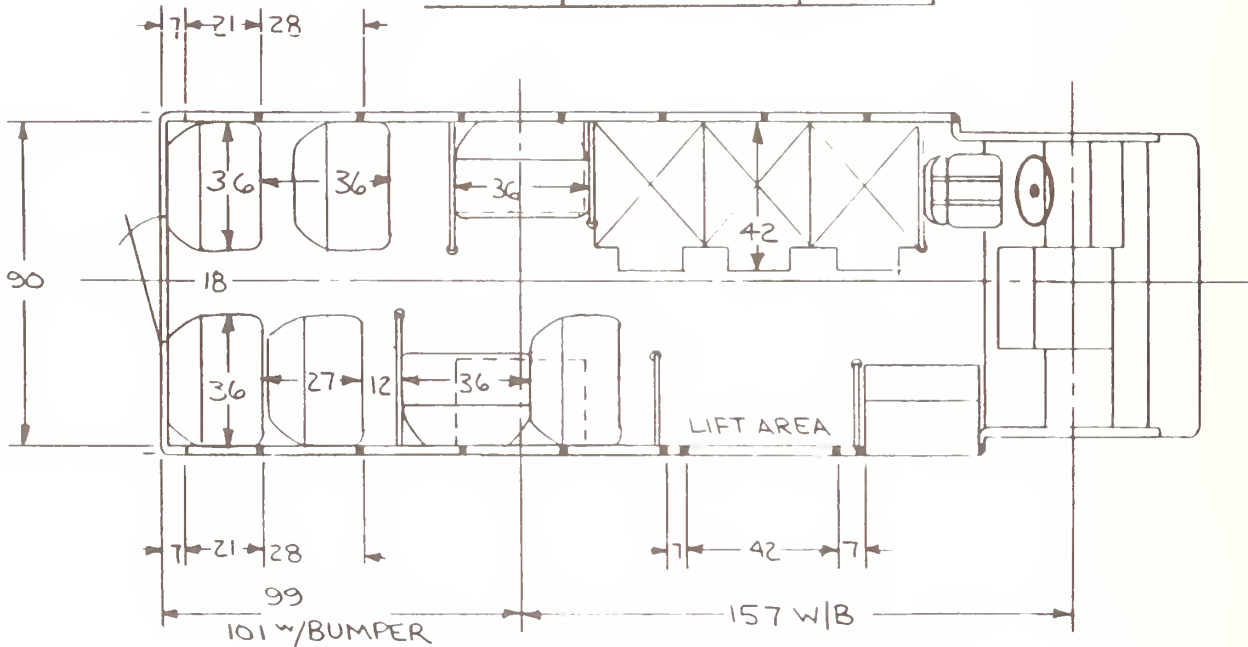
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
18	2	20





30" X 42" PER WHEELCHAIR

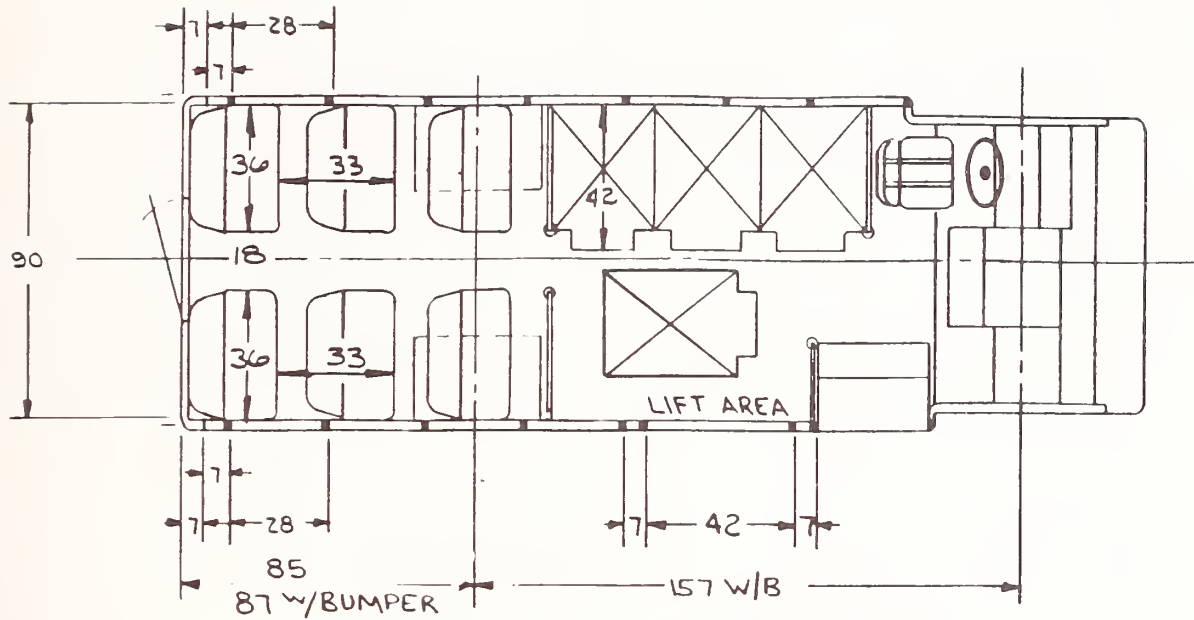
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
12	3	15



30" X 42" PER WHEELCHAIR

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
21	3	24

Comparable to PennDOT Spec A/L - Accessible
Nineteen (19) Passenger Small Transit Bus

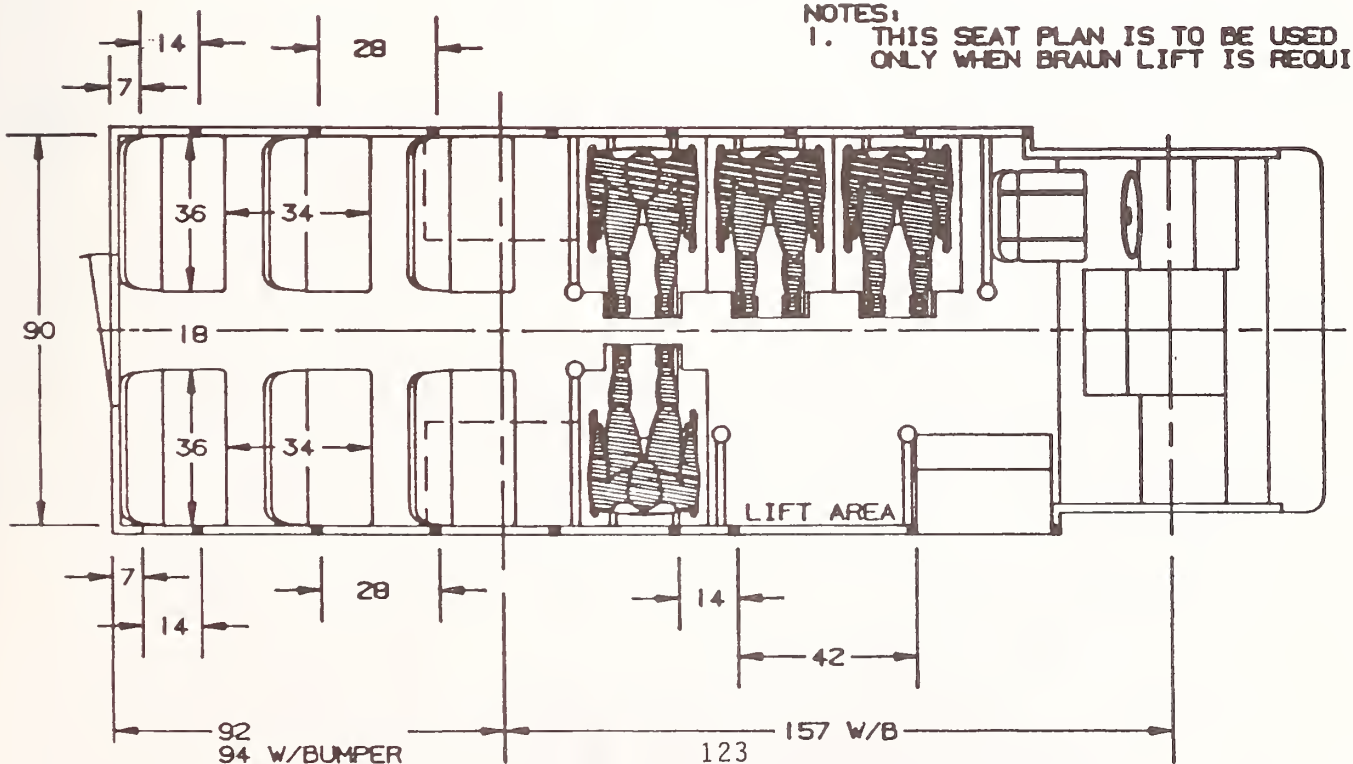


SCALE: $\frac{1}{4}" = 1'$ MATERIAL: 30" PER WHEELCHAIR

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
12	4	16

NOTES:

1. THIS SEAT PLAN IS TO BE USED ONLY WHEN BRAUN LIFT IS REQUIRED

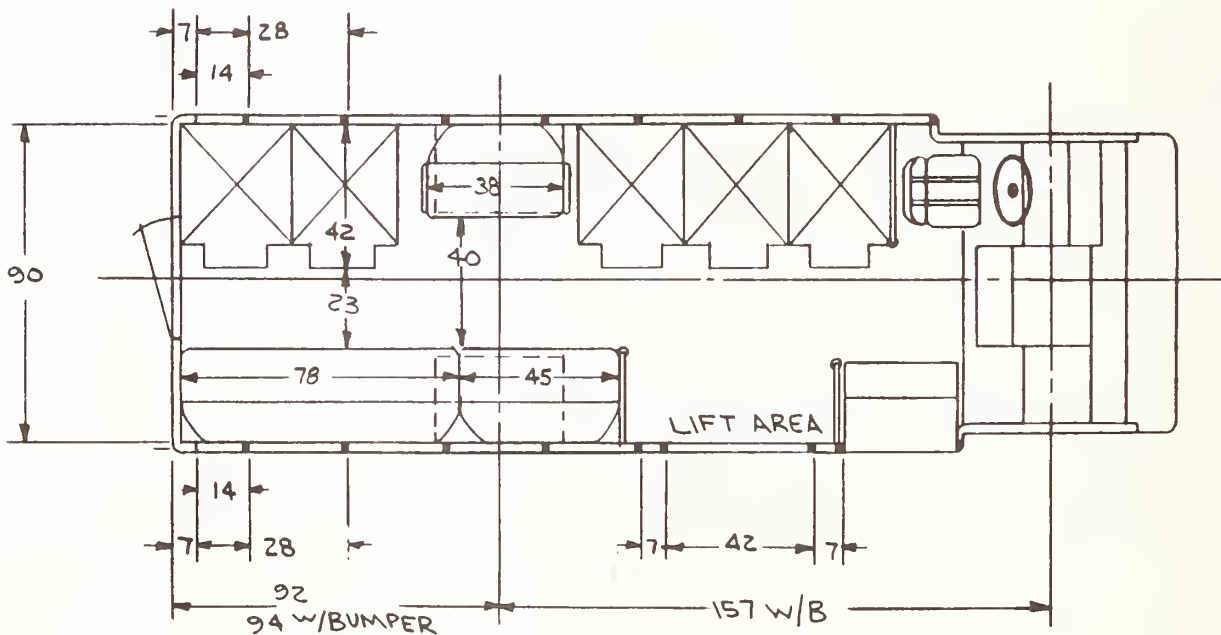


NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
12	4	16

A hand-drawn floor plan of a vehicle interior, likely a truck or bus, showing dimensions in inches. The plan is oriented horizontally with the front of the vehicle on the right. Key features and dimensions include:

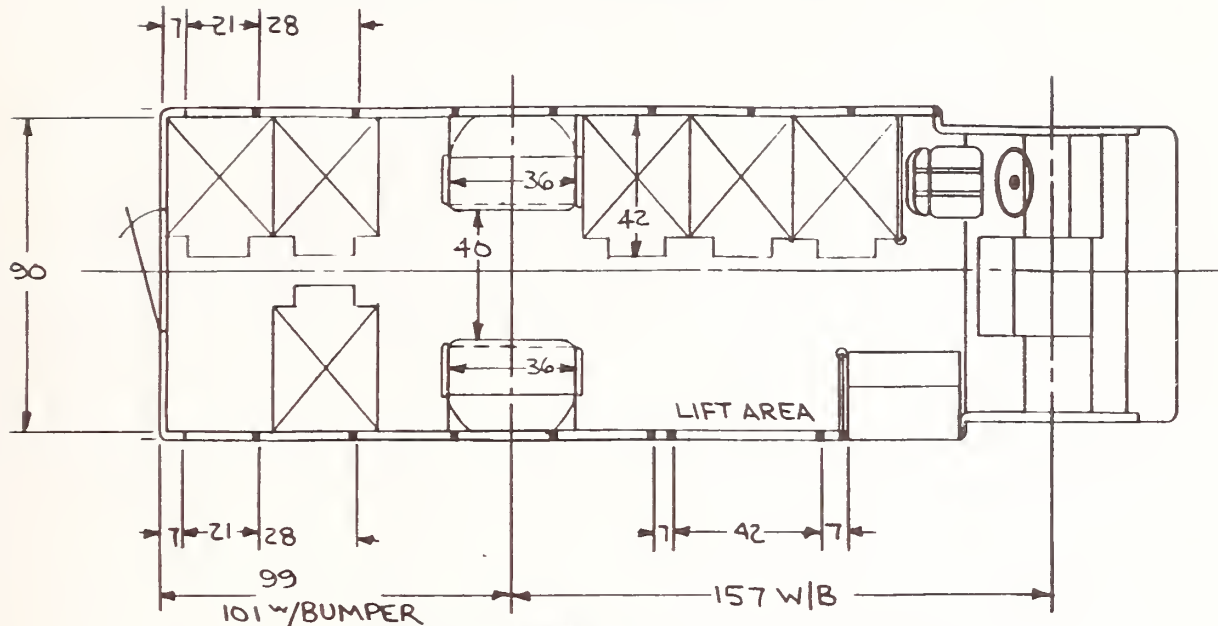
- Overall Dimensions:**
 - Length: 157 w/B (with bumper)
 - Width: 92
 - Height: 90
- Front Section (Right):**
 - Contains a driver's seat and a large rectangular area labeled "LIFT AREA".
 - Dimensions: 42 (width of lift area), 7 (offset from right edge), 7 (offset from left edge of lift area).
- Middle Section:**
 - Contains two rows of seats. The front row has two seats with a width of 38 and a gap of 21 between them.
 - Dimensions: 38 (seat width), 21 (seat gap), 40 (height of seat area).
- Rear Section (Left):**
 - Contains two rows of seats. The front row has two seats with a width of 36 and a gap of 29 between them.
 - Dimensions: 36 (seat width), 29 (seat gap), 12 (height of seat area).
- Structural Details:**
 - Diagonal cross-bracing is shown in the rear section.
 - Dimensions: 7, 28, 14 (top offsets), 14 (bottom offset), 7 (bottom offset).

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
9	5	14



NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
9	5	14

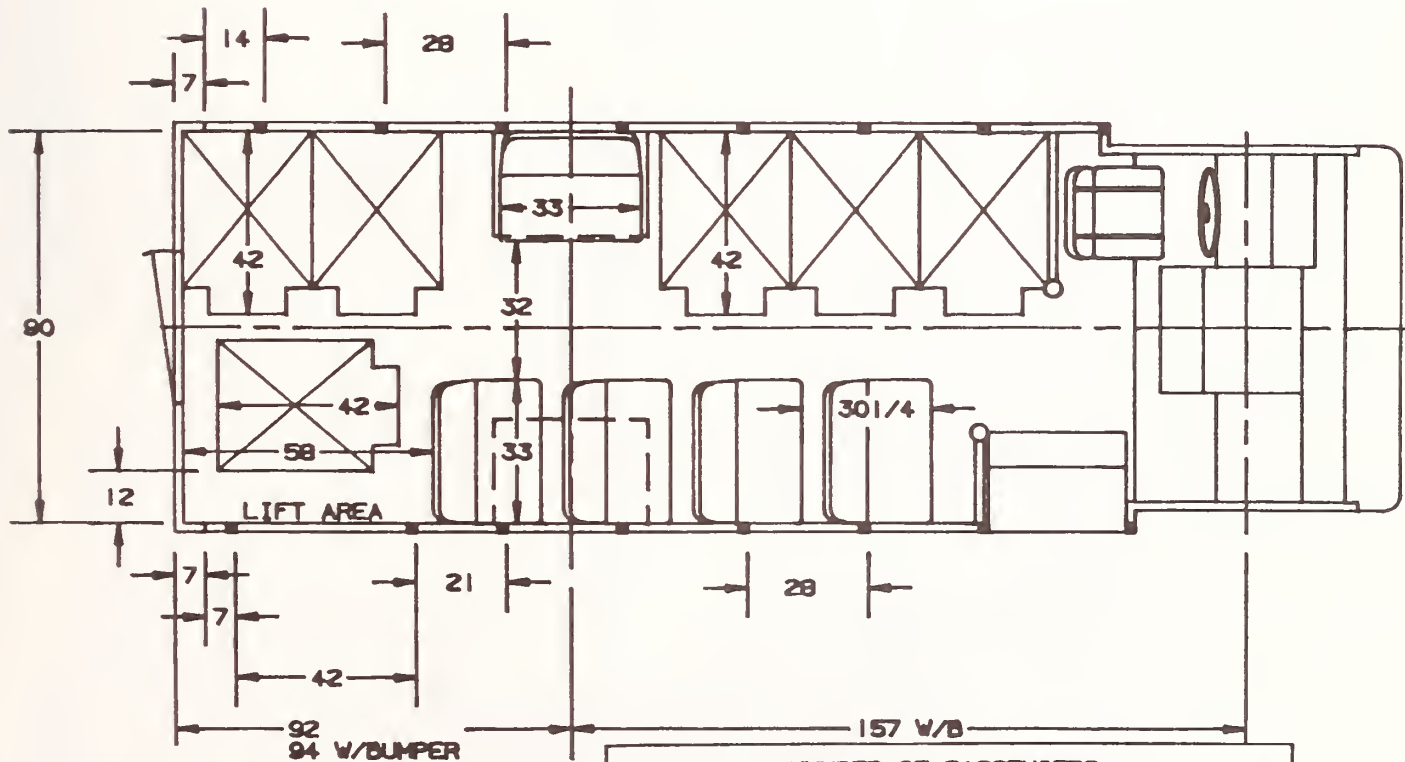
Comparable to PennDOT Spec A/L - Accessible
Nineteen (19) Passenger Small Transit Bus



SCALE $\frac{1}{4}" = 1'$ MATERIAL 30 PER WHEELCHAIR

NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
4	6	10

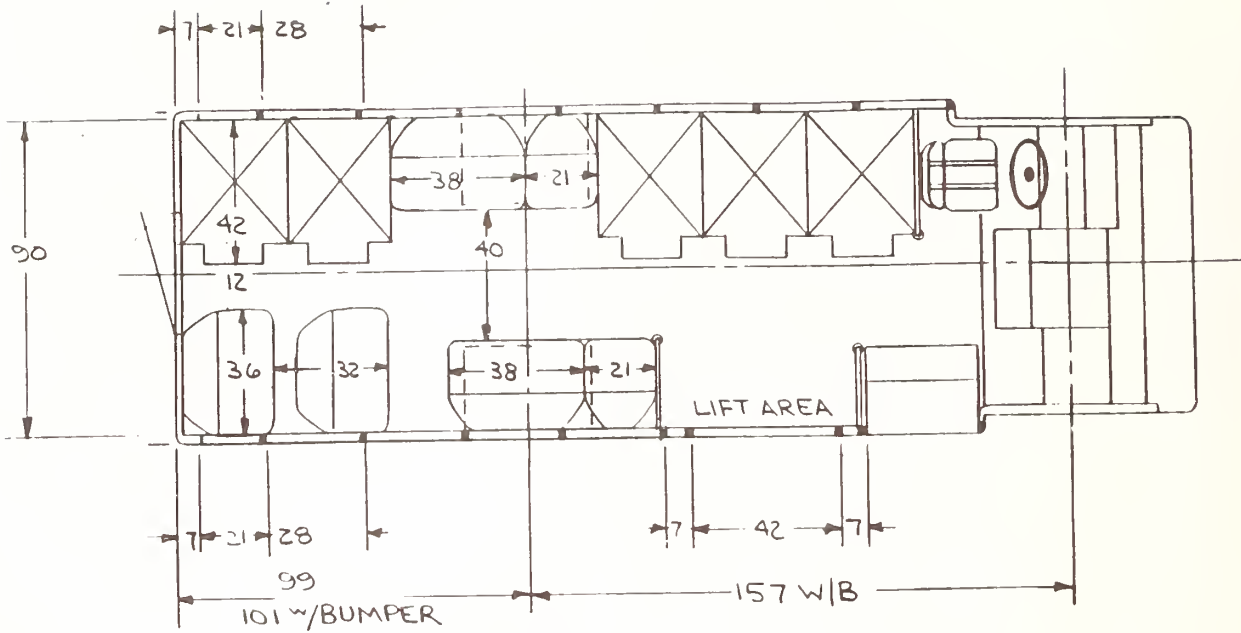
LONGITUDINAL SEATING



NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
10	6	16

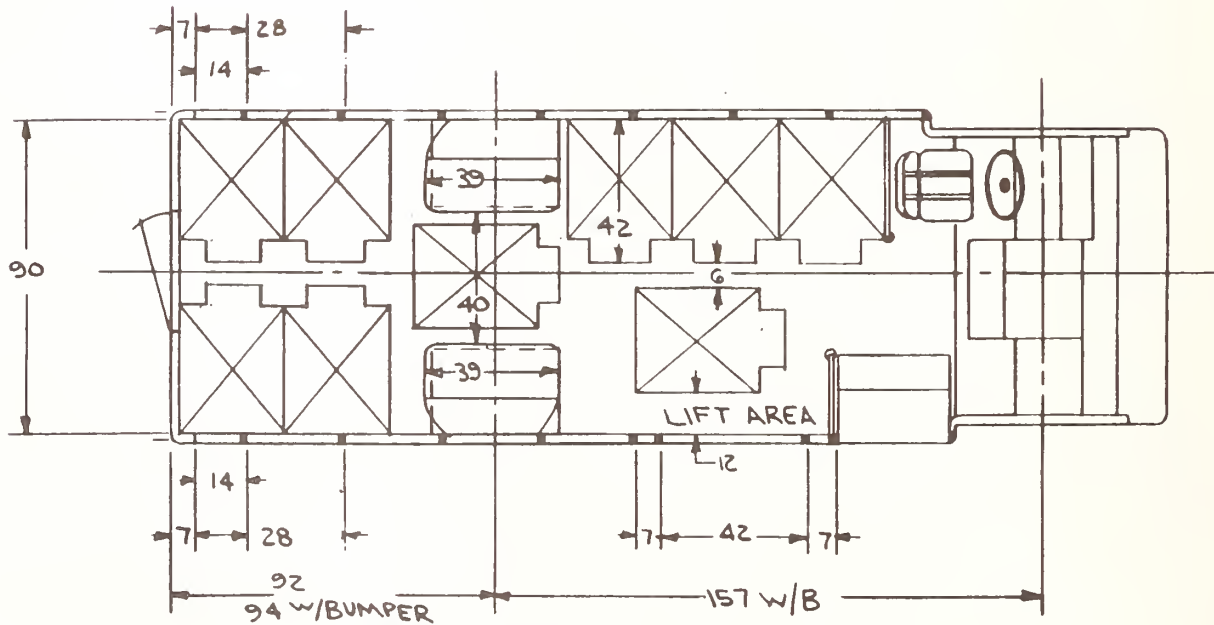
125

Comparable to PennDOT Spec A/L - Accessible
Nineteen (19) Passenger Small Transit Bus



SCALE $\frac{1}{4}" = 1'$ MATERIAL 29 1/2" PER WHEELCHAIR

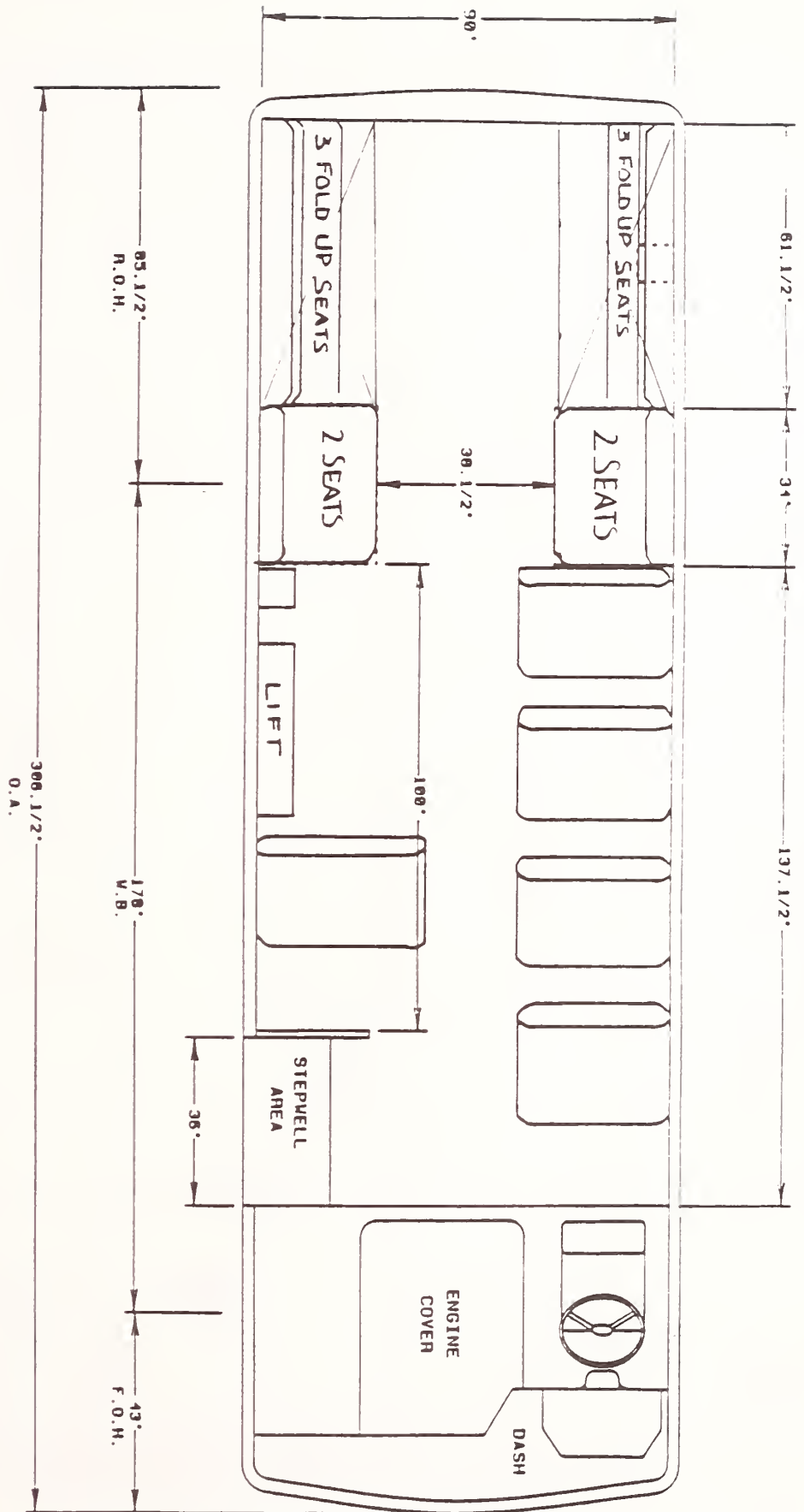
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
10	5	15



SCALE $\frac{1}{4}" = 1'$ MATERIAL 30" PER WHEELCHAIR

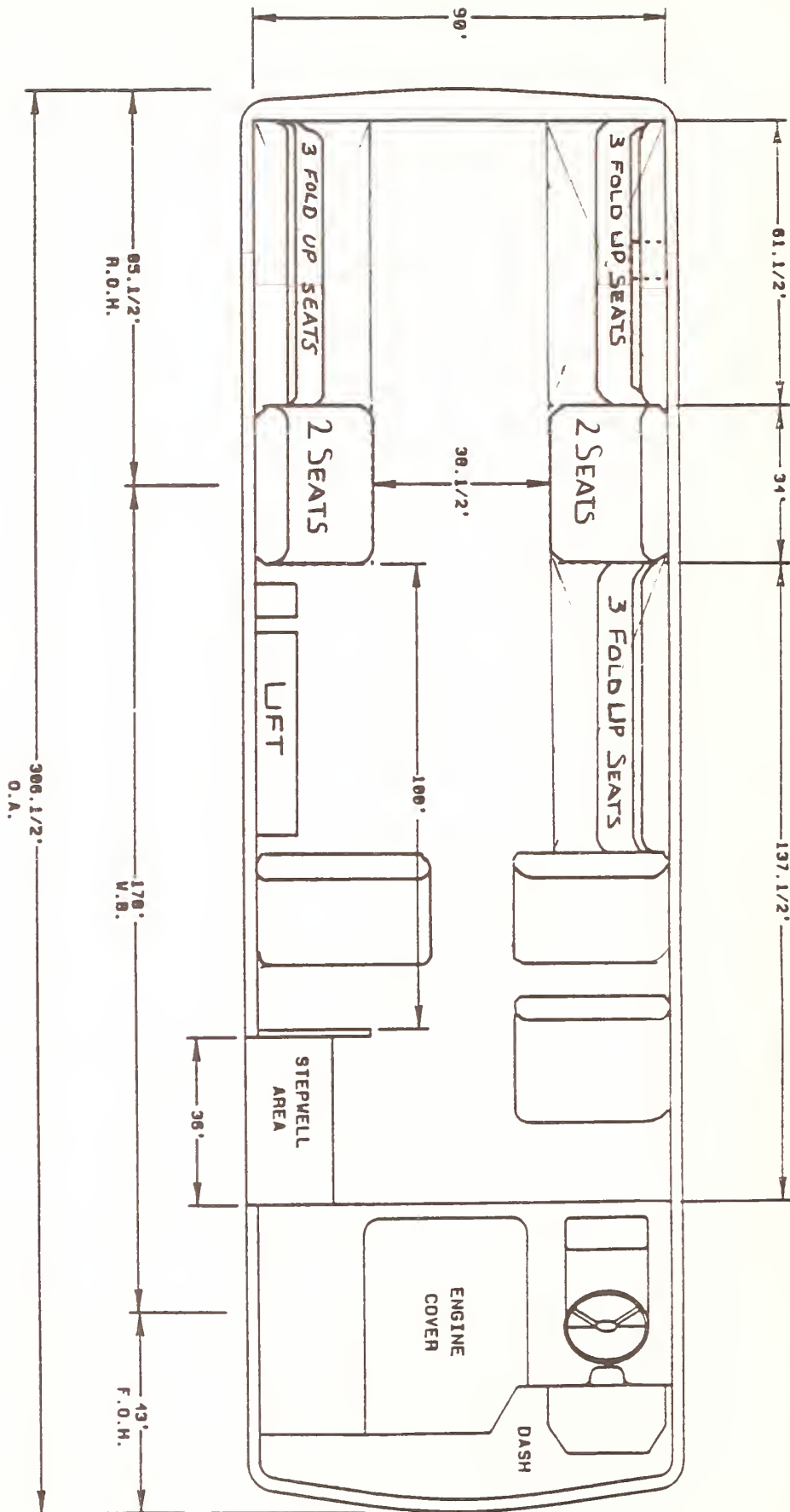
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
4	9	13

Comparable to PennDOT Spec A/M - Accessible
Twenty-three (23) Passenger Small Transit Bus



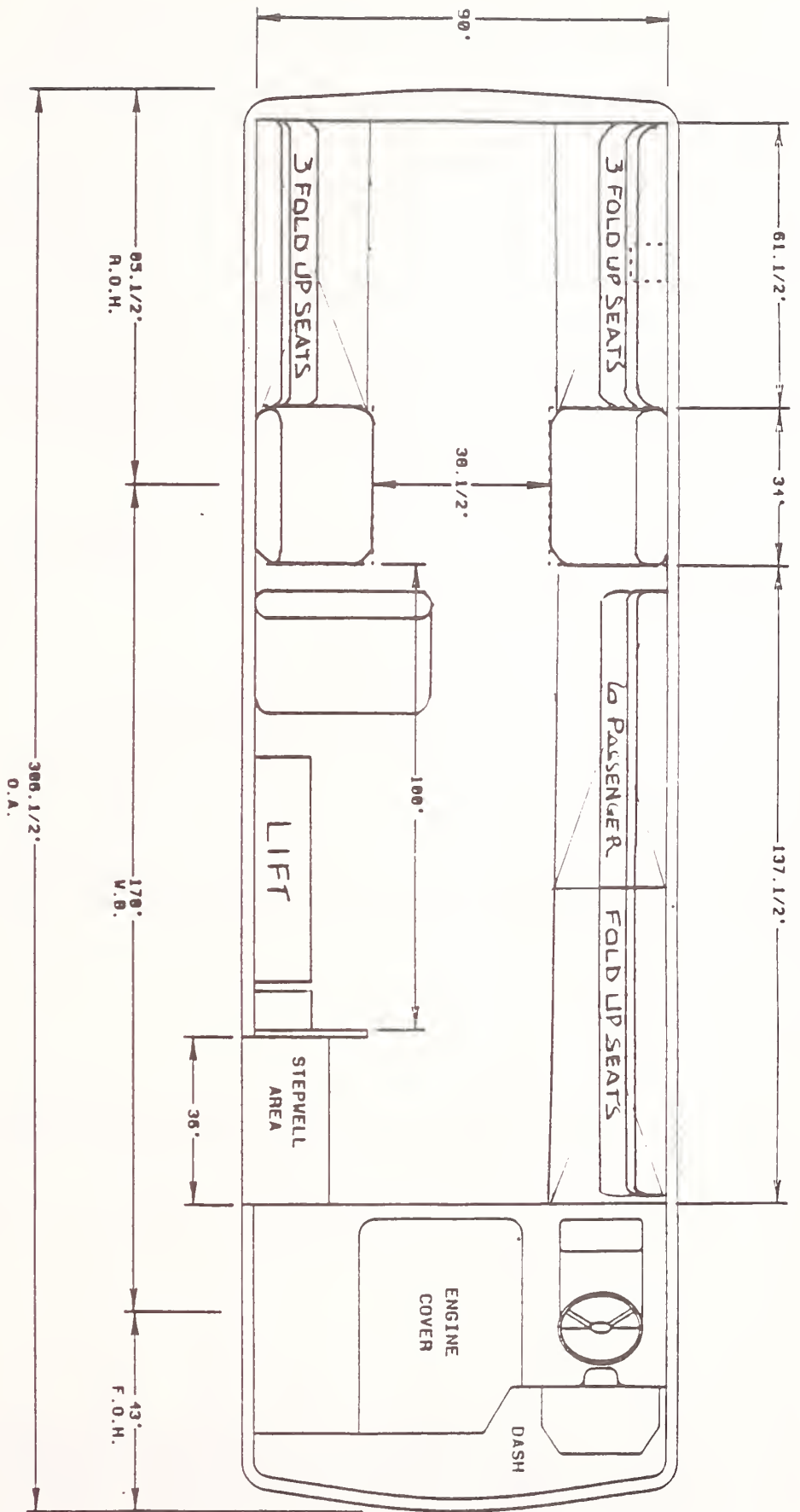
SCALE 1/32	APPROVED BY	REV
DESCRIPTION		
14+2 PASSENGER		
178" CHASSIS	DRAWING NUMBER	PROPOSAL

Comparable to PennDOT Spec A/M - Accessible
Twenty-three (23) Passenger Small Transit Bus



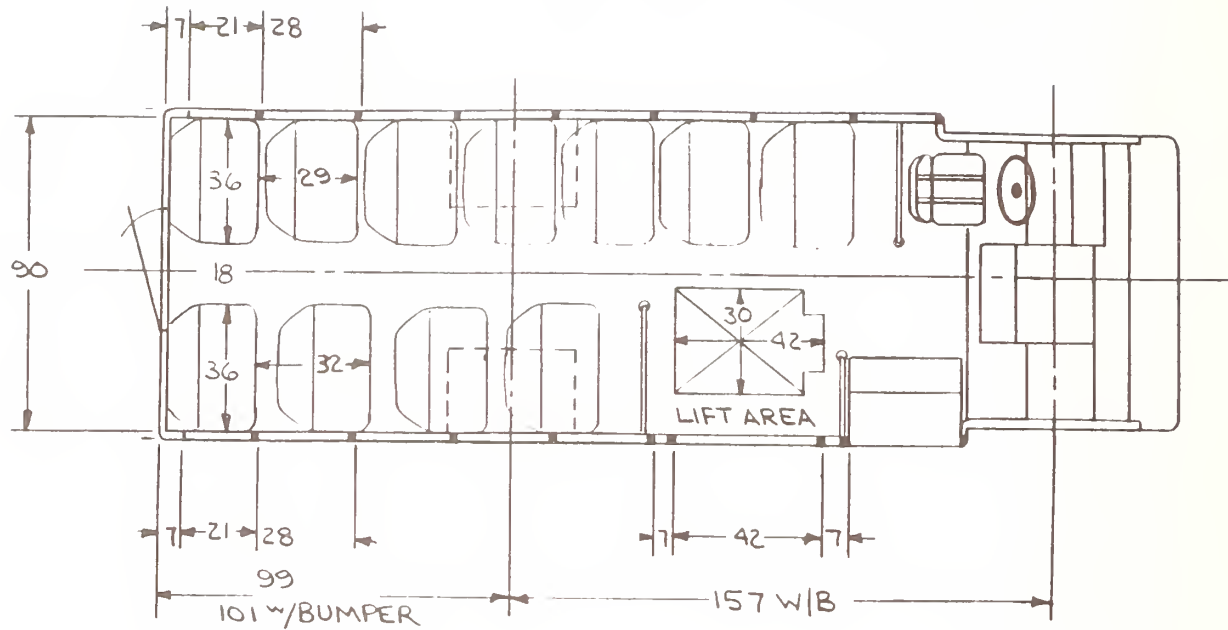
SCALE 1/32	APPROVED BY	REV
DESCRIPTION	10+3 PASSENGER	
178' CHASSIS	DRAWING NUMBER PROPOSAL	

Comparable to PennDOT Spec A/M - Accessible
Twenty-three (23) Passenger Small Transit Bus



SCALE 1/32	APPROVED BY	REV
DESCRIPTION		
6+4 PASSENGERS		
170" CHASSIS		DRAWING NUMBER
		PROPOSAL

Comparable to PennDOT Spec A/M - Accessible
Twenty-three (23) Passenger Small Transit Bus



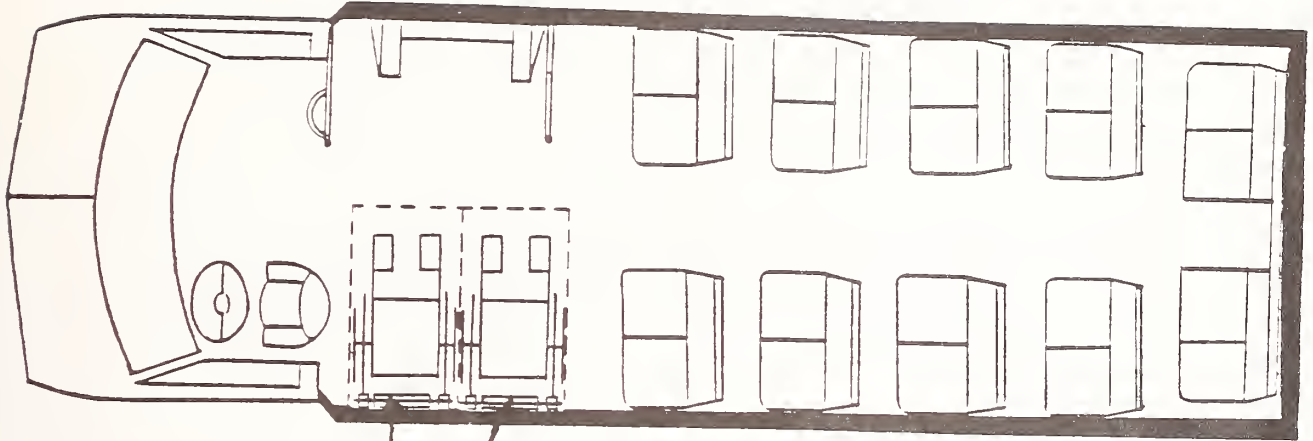
NUMBER OF PASSENGERS		
SEATED	WHEELCHAIR	TOTAL
22	1	23



VIP 2800-F

MODEL	WHEEL BASE	EXTERIOR			INTERIOR WIDTHS			AISLE HEIGHT
		LENGTH	WIDTH	HEIGHT	FLOOR	HIP	SHOULDER	
VIP 2800	176" TA ¹	329"	96"	112"	93"	93"	90"	75 1/4"

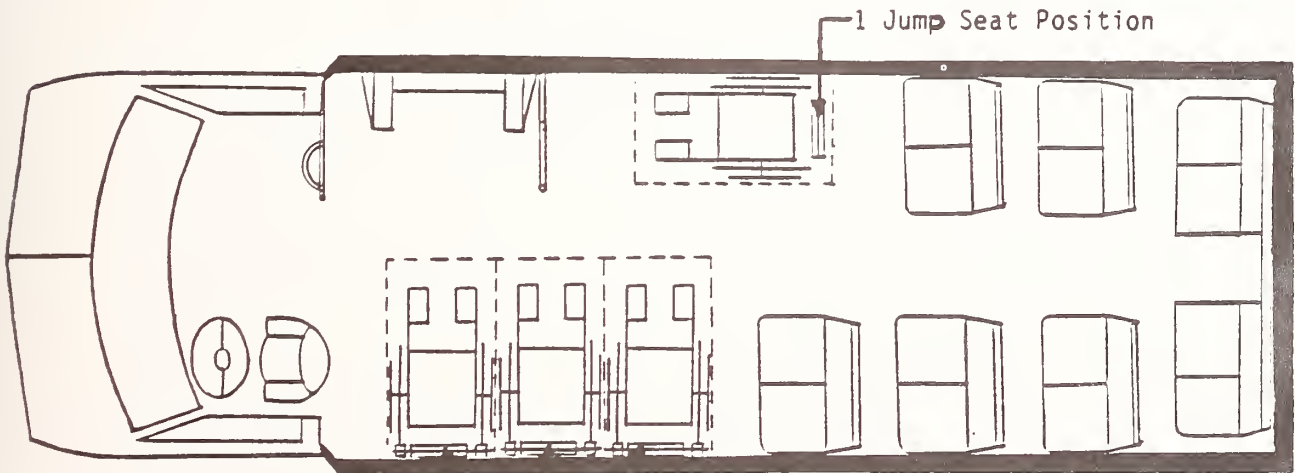
Comparable to PennDOT Spec A/M - Accessible
Twenty-three (23) Passenger Small Transit Bus



1 Jump Seat Position at each location

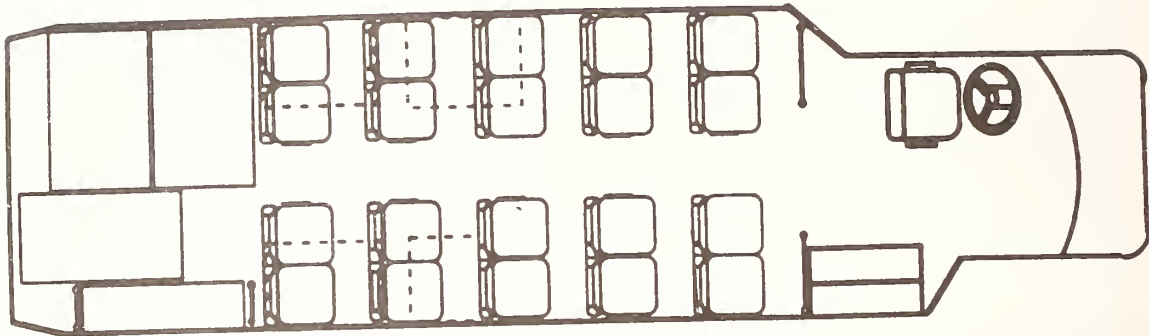


1 Jump Seat Position at each location

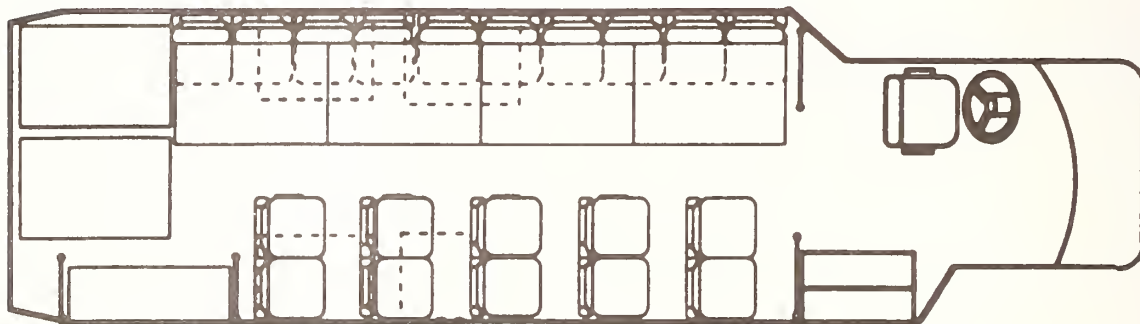


1 Jump Seat Position at each location

Comparable to PennDOT Spec A/M - Accessible
Twenty-three (23) Passenger Small Transit Bus



3 W.C. 20 Passenger



6 W.C. 10 Passenger

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